

Figure 7-1. Continued.



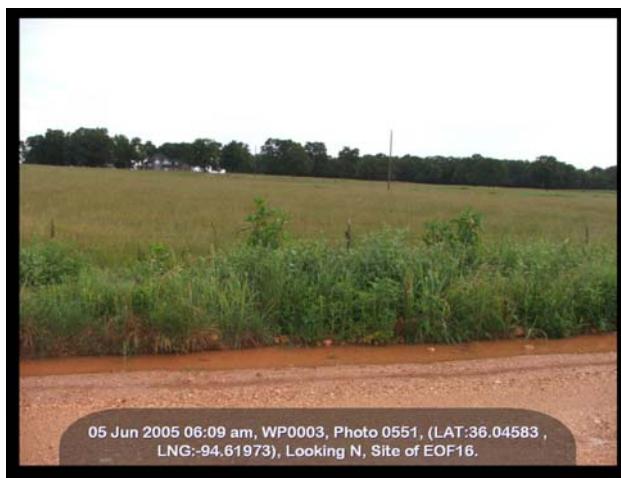
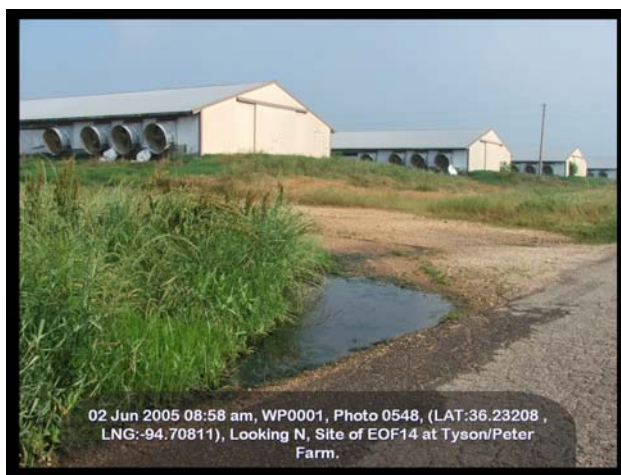


Figure 7-1. Continued.





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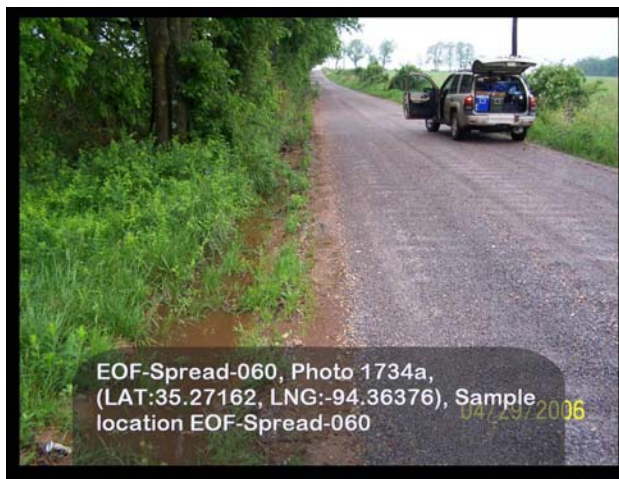
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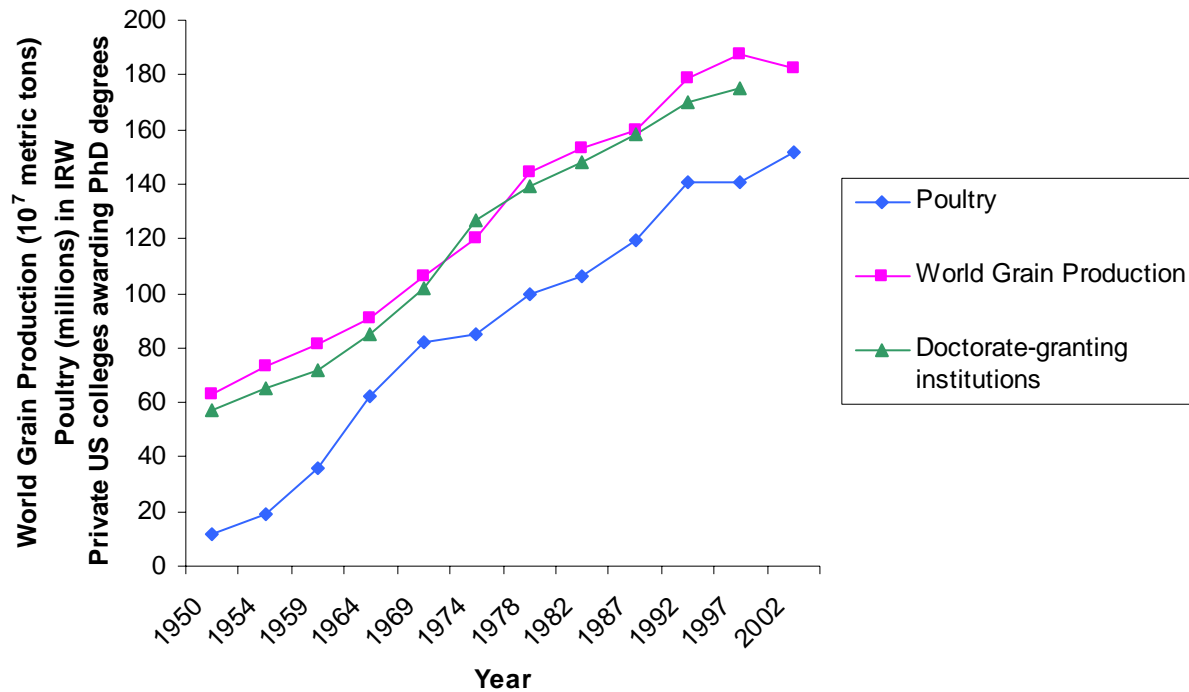
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Figure 7-1. Continued.

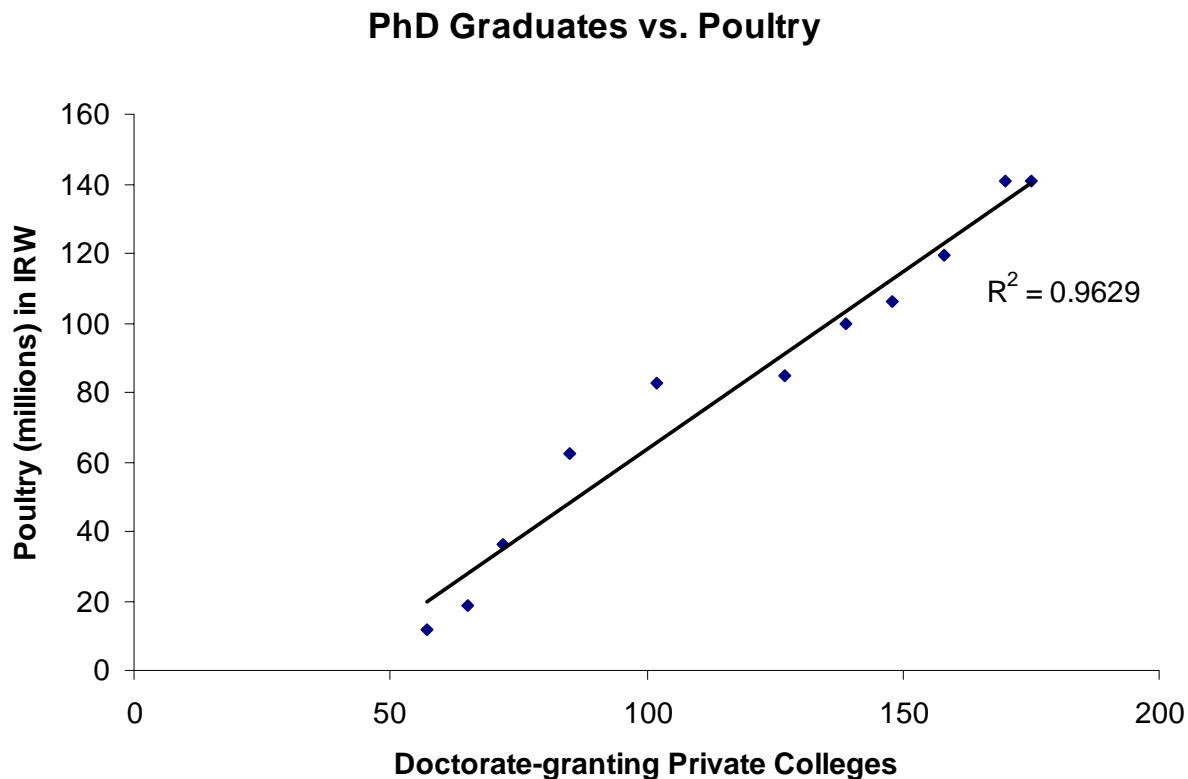




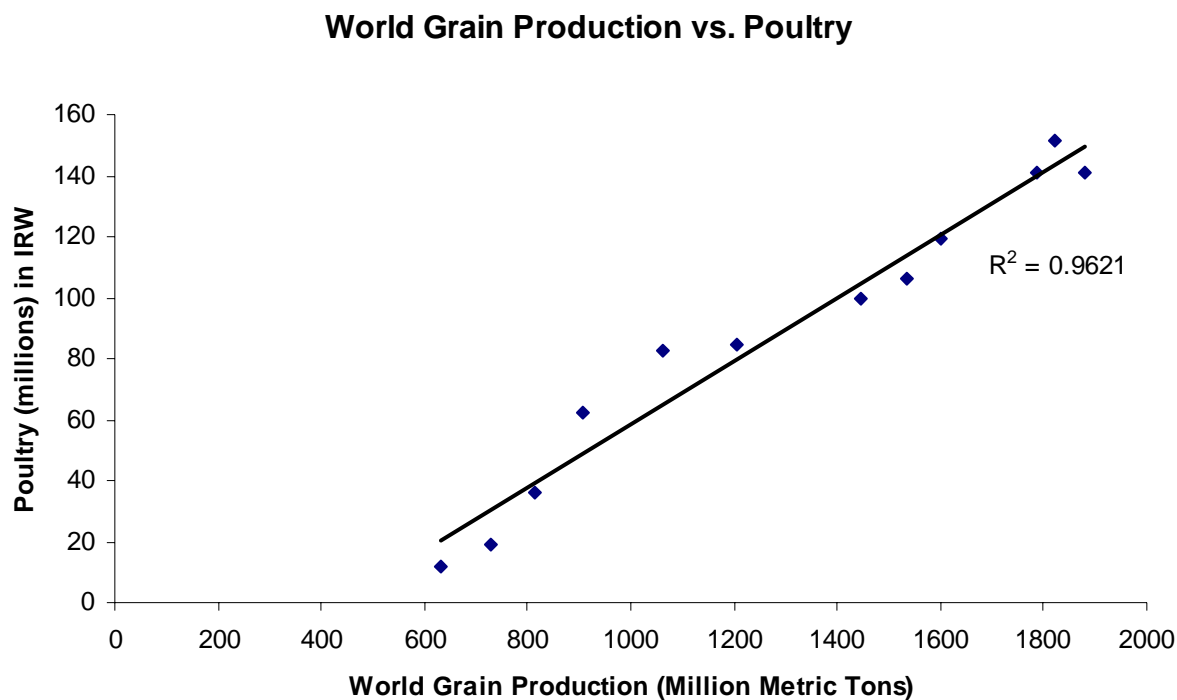
**Figure 7-2. Photographs taken by Dr. Jarman's staff at selected locations of Plaintiffs' edge-of-field sampling sites.**



**Figure 8-1. Total annual world grain production, number of private U.S. colleges awarding doctoral degrees, and the estimated number of poultry in the IRW during the time period 1950 – 2002. Sources: National Science Foundation <http://www.nsf.gov/statistics/nsf06319/figures/fig02-01.htm>; Earth Policy Institute [http://www.earth-policy.org/Indicators/Grain/2006\\_data.htm](http://www.earth-policy.org/Indicators/Grain/2006_data.htm); Expert affidavit of Berton Fisher, disk titled PI-Fisher 0027361**



**Figure 8-2. Number of private U.S. colleges awarding doctoral degrees during the time period 1950 - 2002 versus the number of poultry in the IRW. Sources: National Science Foundation <http://www.nsf.gov/statistics/nsf06319/figures/fig02-01.htm>; Expert affidavit of Berton Fisher, disk titled PI-Fisher 0027361**



**Figure 8-3. Total annual world grain production versus the estimated number of poultry in the IRW during the time period 1950 - 1997. (Sources: Earth Policy Institute [http://www.earth-policy.org/Indicators/Grain/2006\\_data.htm](http://www.earth-policy.org/Indicators/Grain/2006_data.htm); Expert affidavit of Berton Fisher, disk titled PI-Fisher 0027361)**



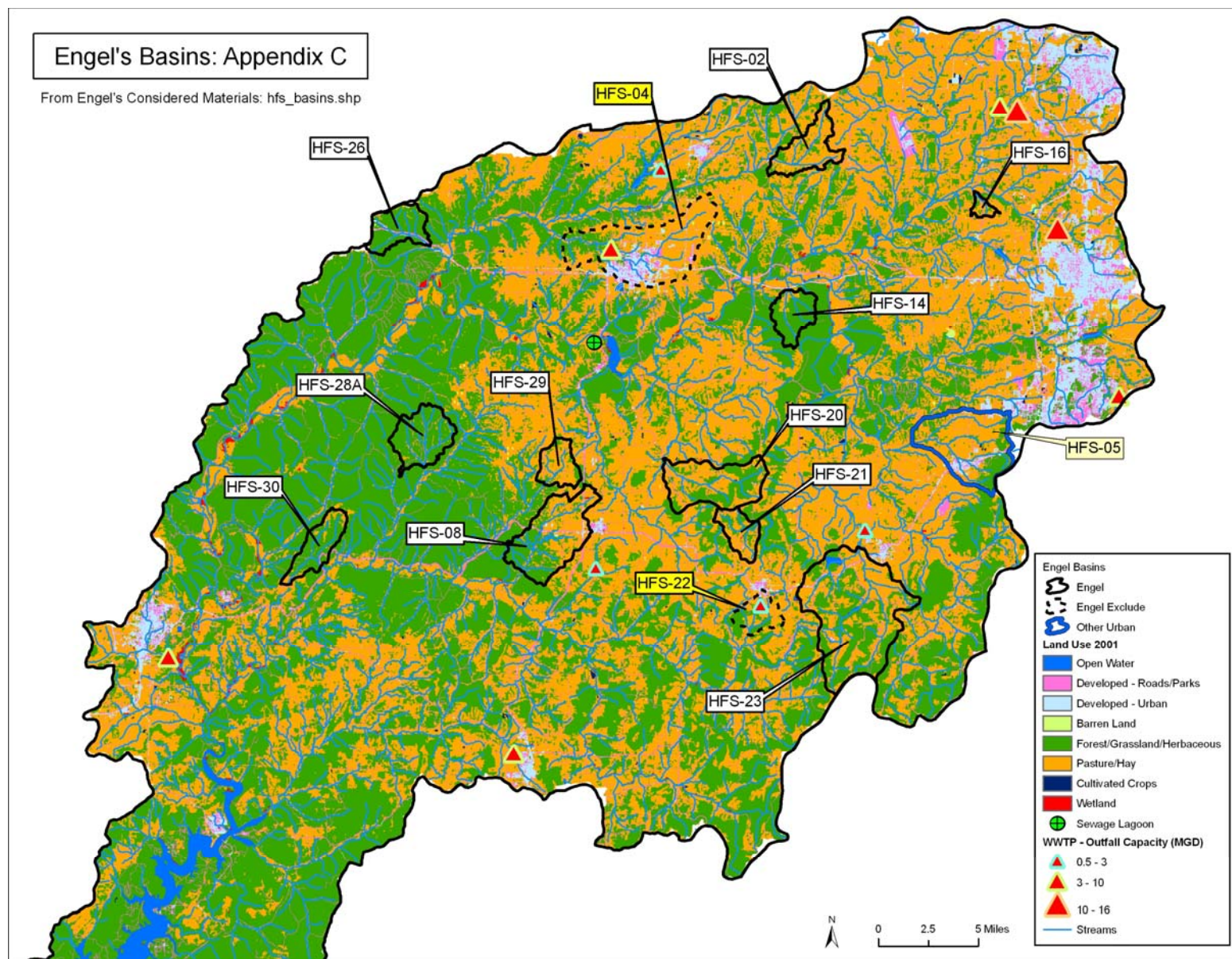
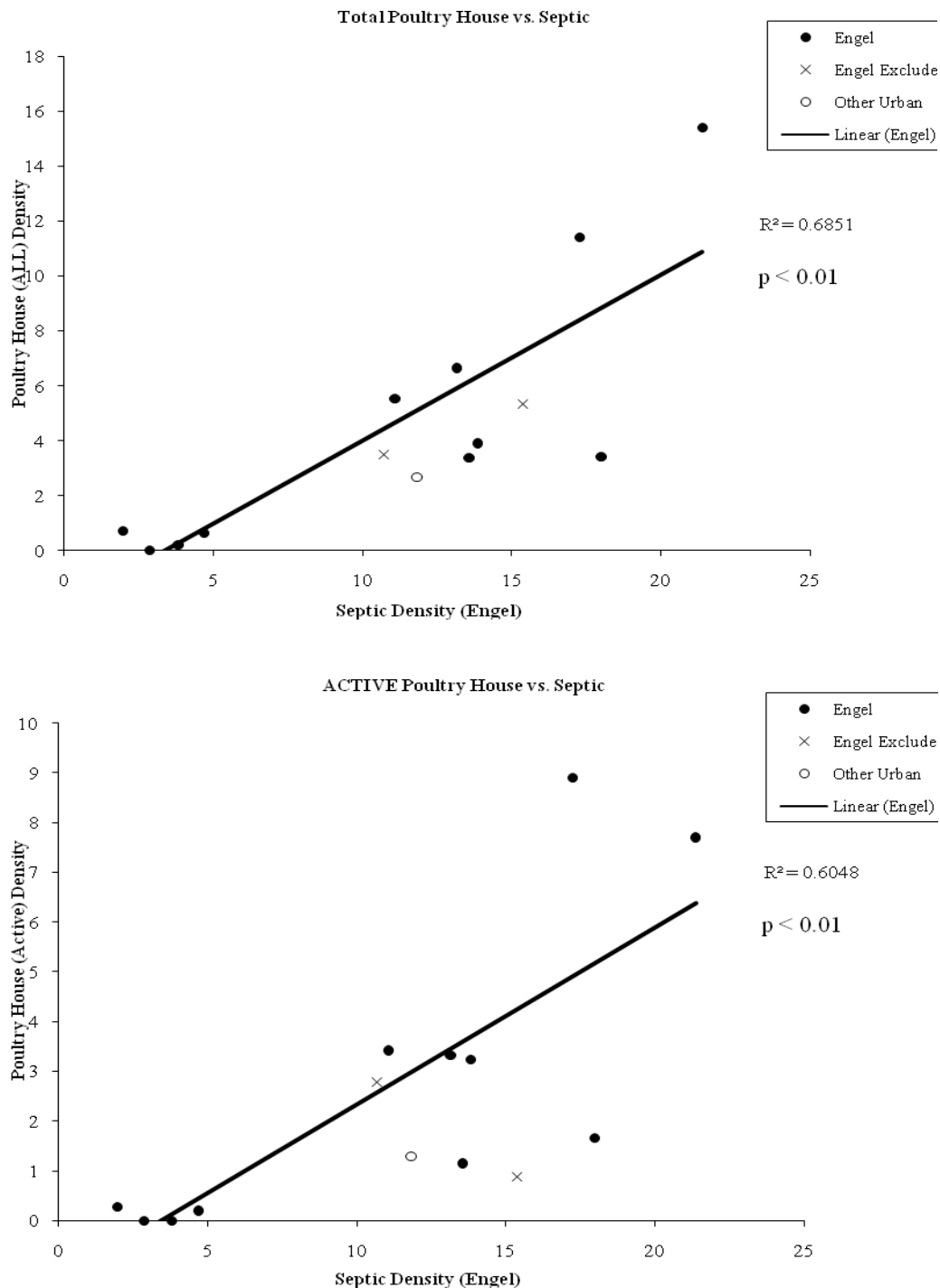
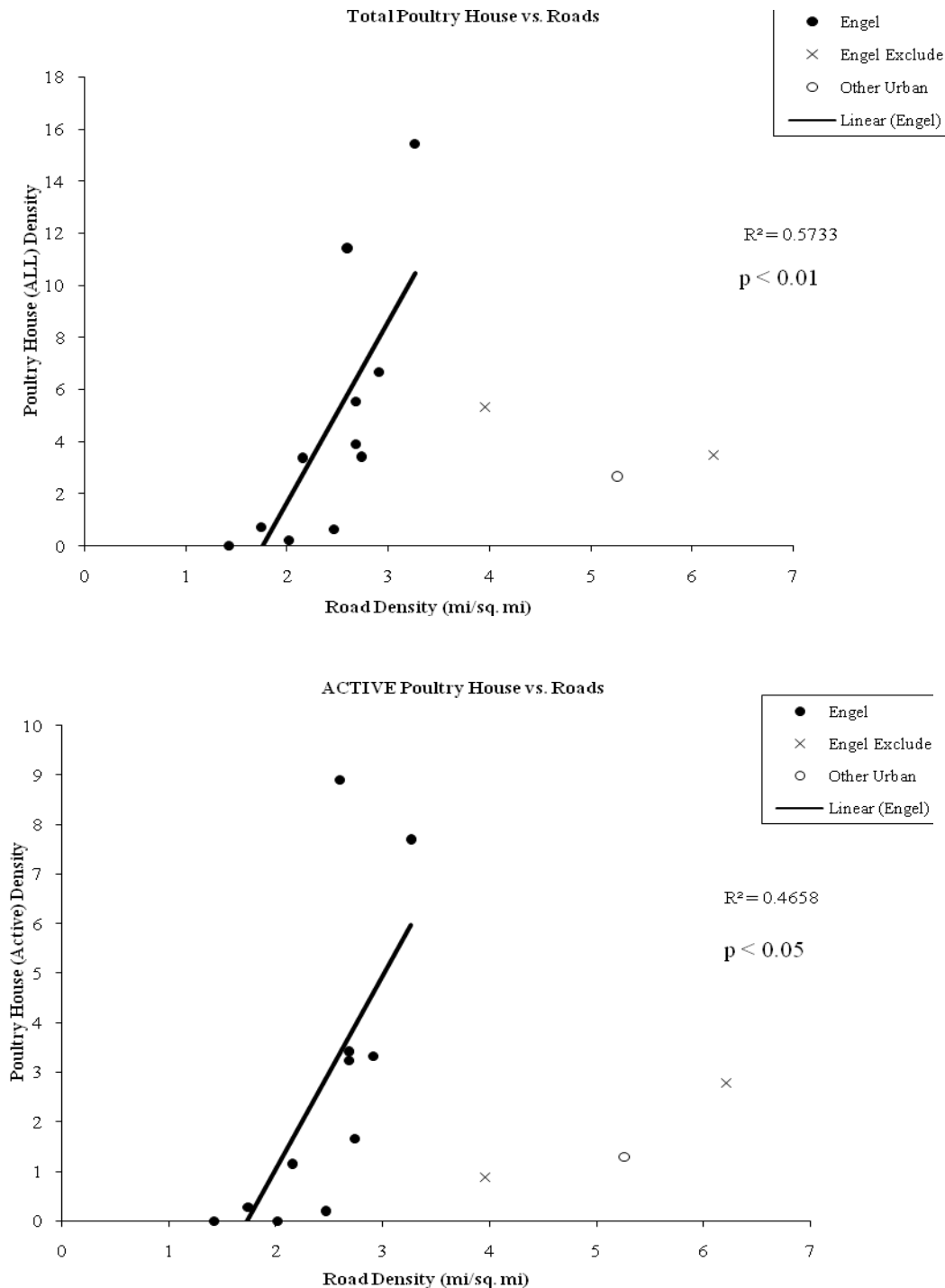


Figure 8-4. Dr. Engel's high flow sampling basins that formed the basis for regression analyses with poultry house density. Two sites were excluded from Dr. Engel's regression analysis (HFS-04, HFS-22) and three sites were excluded from our regression (HFS-04, HFS-05, HFS-22) analysis because of urban and WWTP influence.





**Figure 8-5. Dr. Engel's total (top panel) and active (bottom panel) poultry house density vs. septic density, by Dr. Engel's subwatersheds. Regression statistics are based on subwatersheds having less than 5% urban land use and no WWTP influence. Two of the subwatersheds (x) were excluded by Dr. Engel. A third (o) was not excluded by Dr. Engel, but was excluded from regression calculations here because it had 7% urban land use. Poultry house locations and septic densities were taken from Dr. Engel's data. (Source: poultry\_houses.shp and Engel00000198\_septic-density\_new.xls from Dr. Engel's considered materials)**

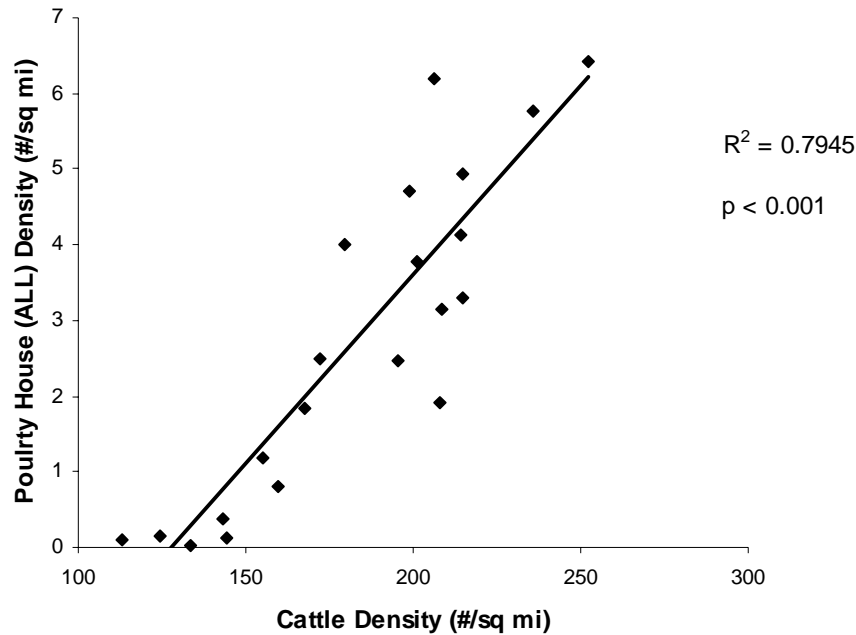


**Figure 8-6.** Dr. Engel's total (top panel) and active (bottom panel) poultry house density vs. road density, by Dr. Engel's subwatersheds. Regression statistics are based on subwatersheds having less than 5% urban land use and no WWTP influence. Two of the subwatersheds (x) were excluded by Dr. Engel. A third (o) was not excluded by Dr. Engel, but was excluded from regression calculations here because it had 7% urban land use. (Source: poultry\_house.shp from Dr. Engels considered materials and TIGER/Line 2000 Streets dataset)



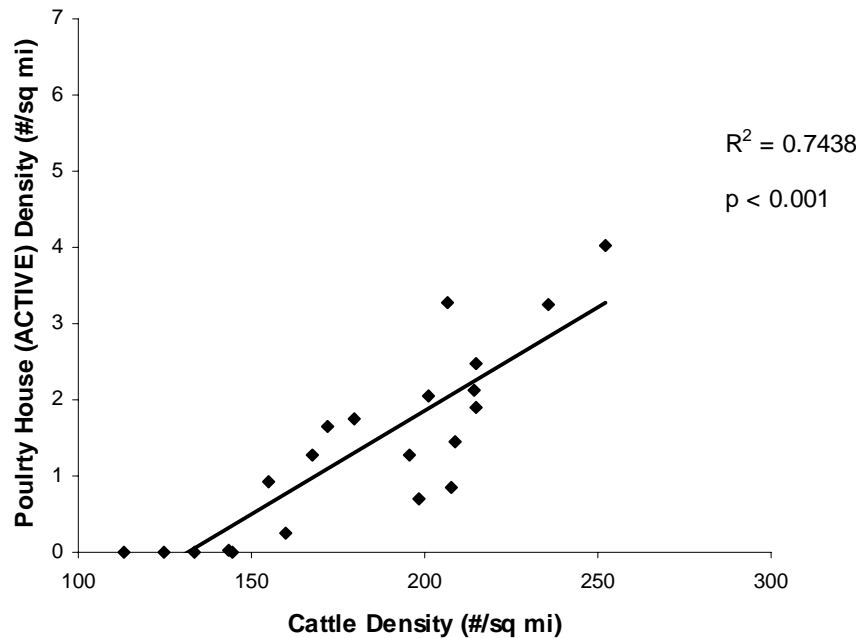
A)

Total Poultry House vs. Cattle by Zip Code

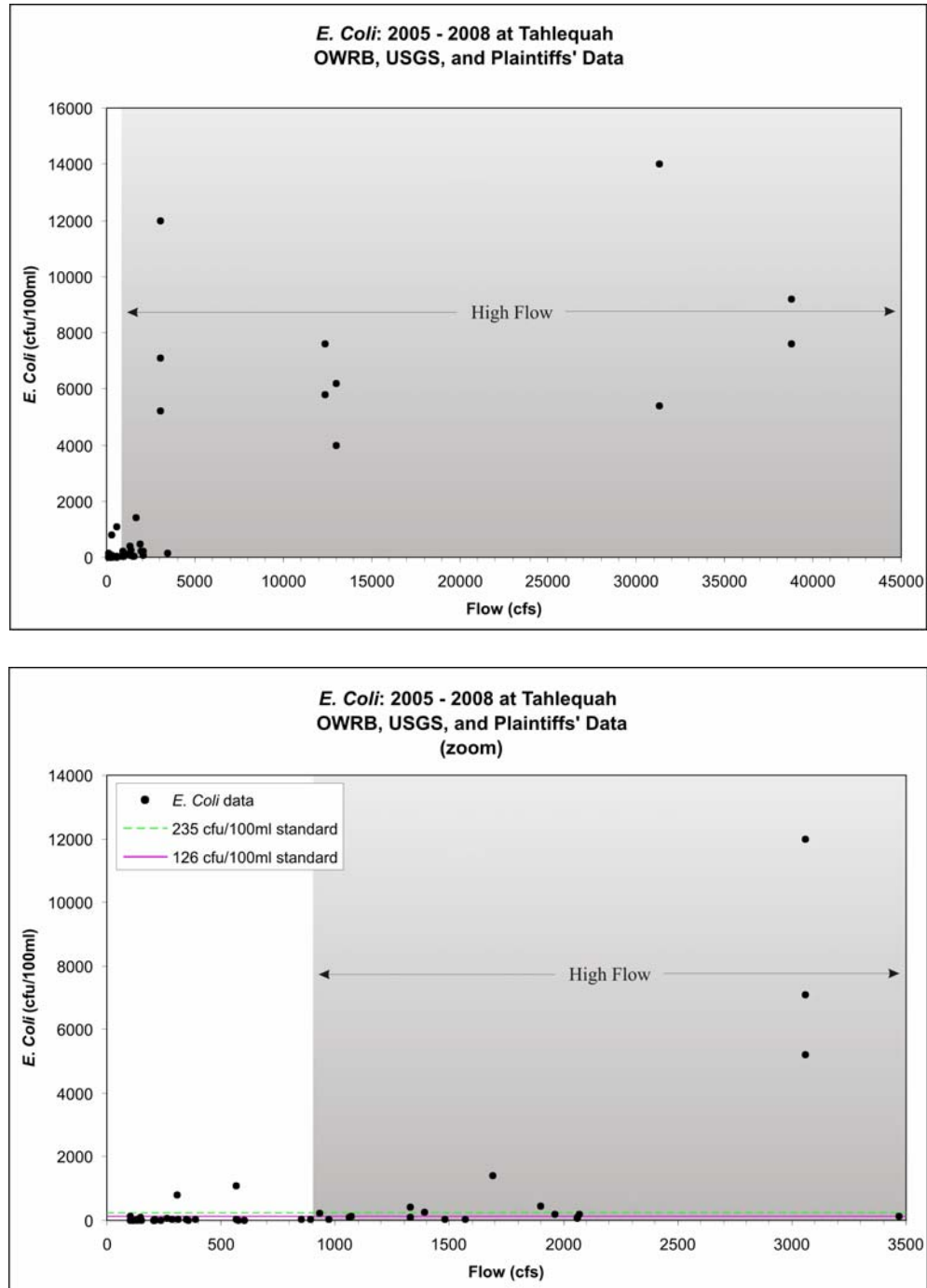


B)

ACTIVE Poultry House vs. Cattle by Zip Code



**Figure 8-7. Total (top panel) poultry house density and active (bottom panel) poultry house density vs. cattle density, by zip code throughout the IRW. Zip codes included have less than 20% urban land use, are more than 50% within the IRW, and are greater than 1 sq. mile. (Source: poultry\_houses.shp from Dr. Engel's considered materials and Dr. Billy Clay calculations from USDA 2002 Census of Agriculture data)**



**Figure 10-1.** Relationships between fecal indicator bacteria concentration and river flow for samples collected by the USGS, OWRB, and the Plaintiffs between 2005 and 2008 in the Illinois River near Tahlequah, OK. *E. coli* results are shown on the first page; fecal coliform results are shown on the second page. Each dot represents one sample. All data are shown in the top panels; only subsets of the data (samples collected under flows less than 3500 cfs) are shown in the bottom panels. The region of the charts that illustrate high flow periods are shaded in gray tone. For this analysis, high flow is defined as flows above the 70<sup>th</sup> percentile of long-term daily flows at that location. Fecal indicator bacterial concentrations are generally below the primary body contact recreation standards except when flow is high.



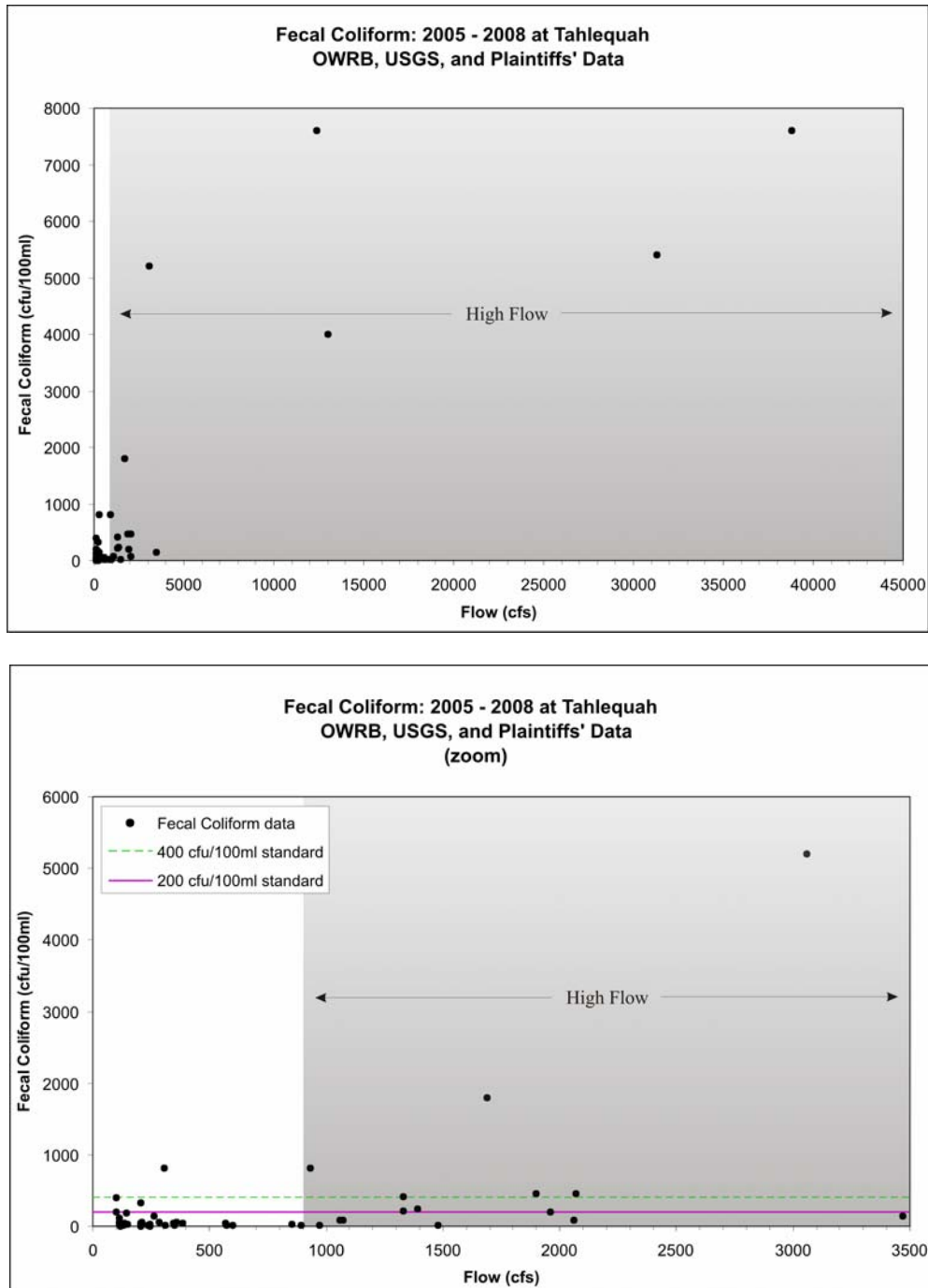
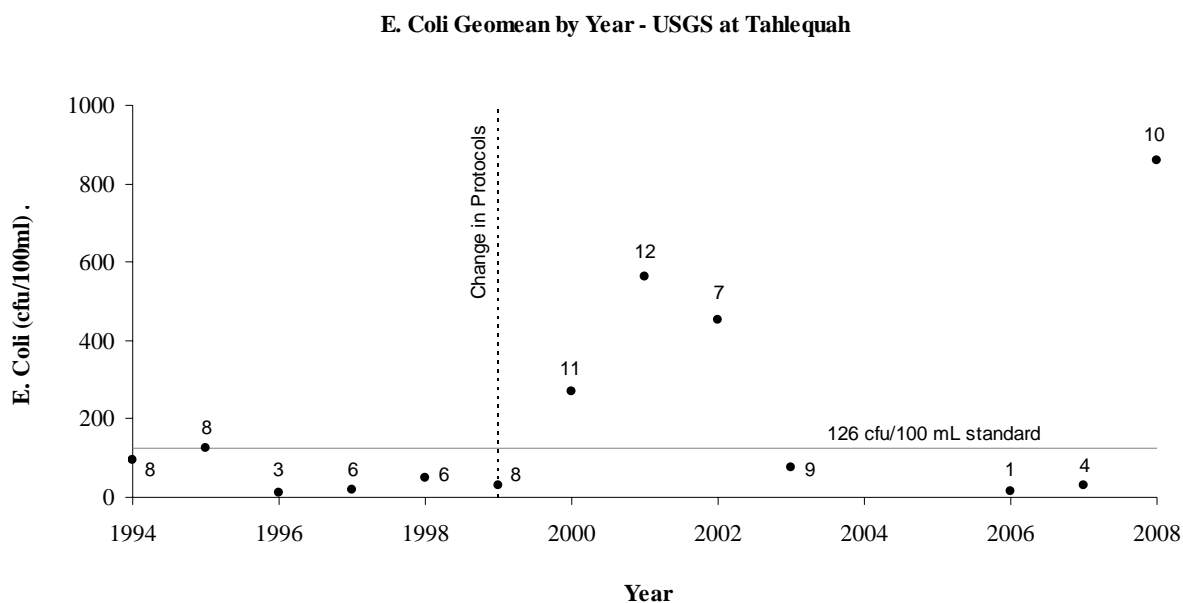
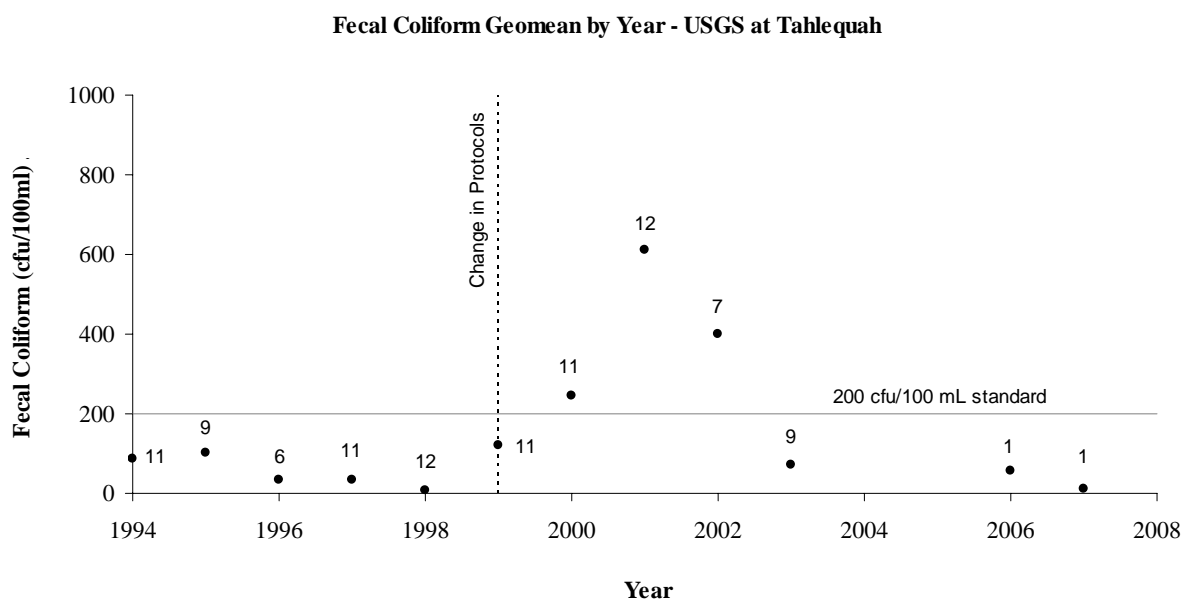


Figure 10-1. Continued.

A)



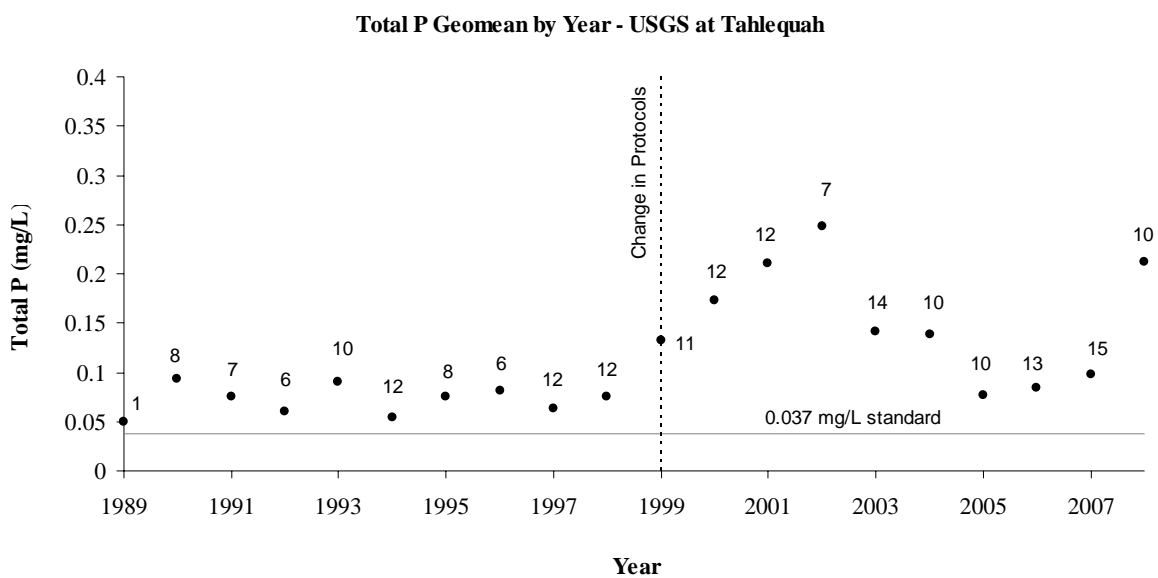
B)



**Figure 10-2. Geomean concentrations of A) *E. coli*, B) fecal coliform bacteria and C) total P, over the period of record sampled by USGS in the Illinois River at Tahlequah. The number of samples is given over each data point geomean.**

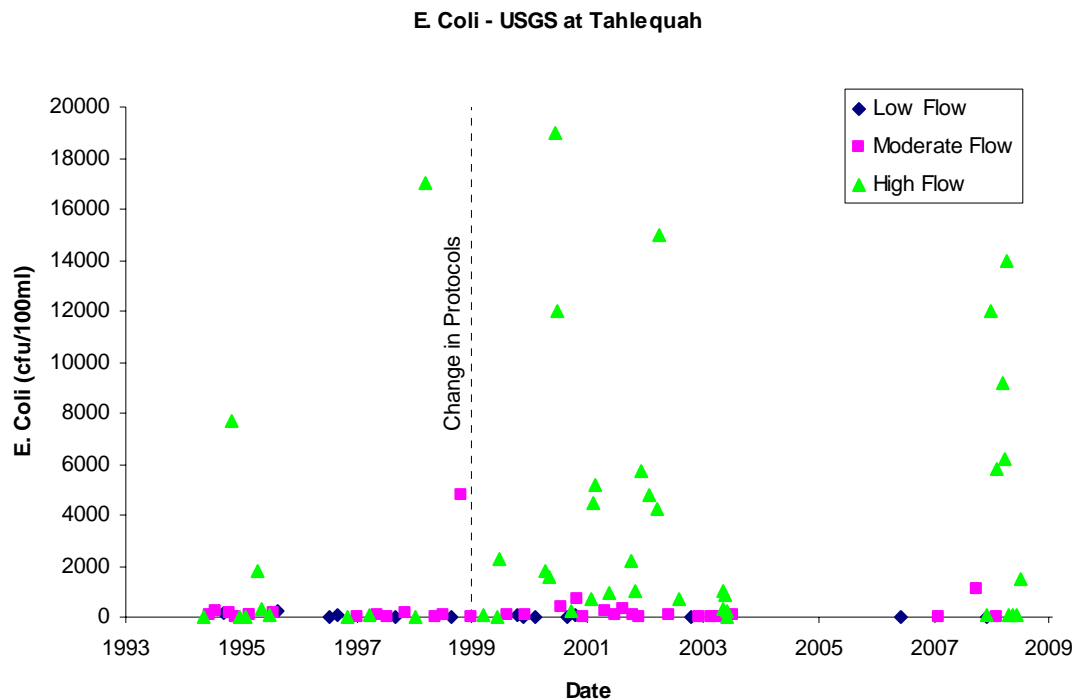


C)

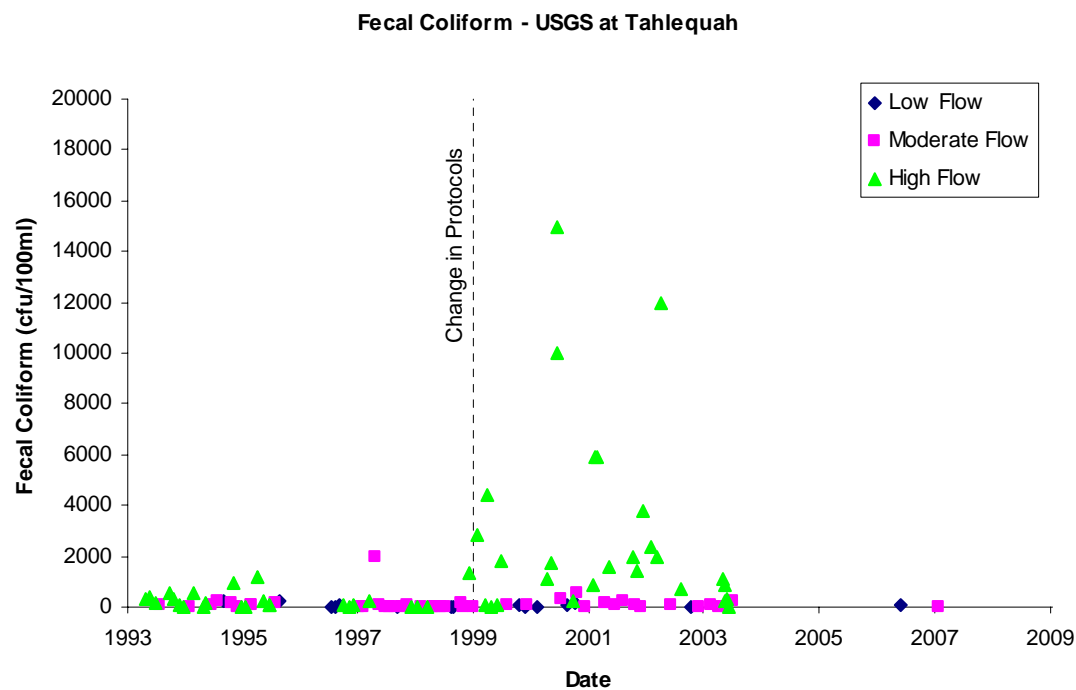


**Figure 10-2. Continued.**

A)

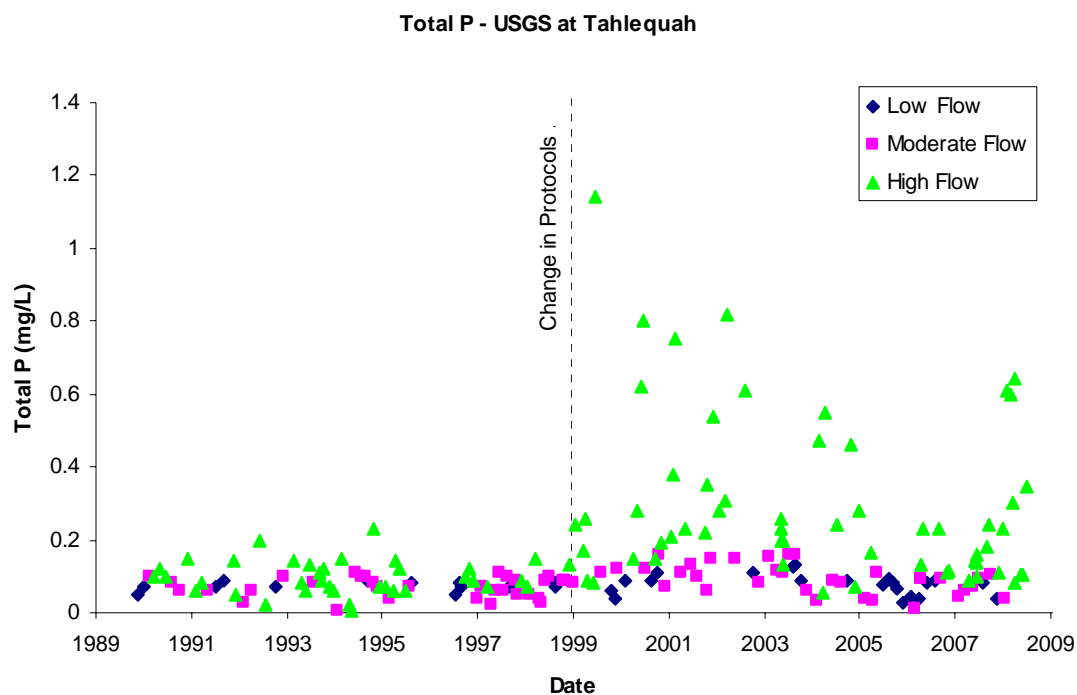


B)



**Figure 10-3. Concentrations in individual samples of A) *E. coli*, B) fecal coliform bacteria and C) total P over the period of record sampled by USGS in the Illinois River at Tahlequah.**

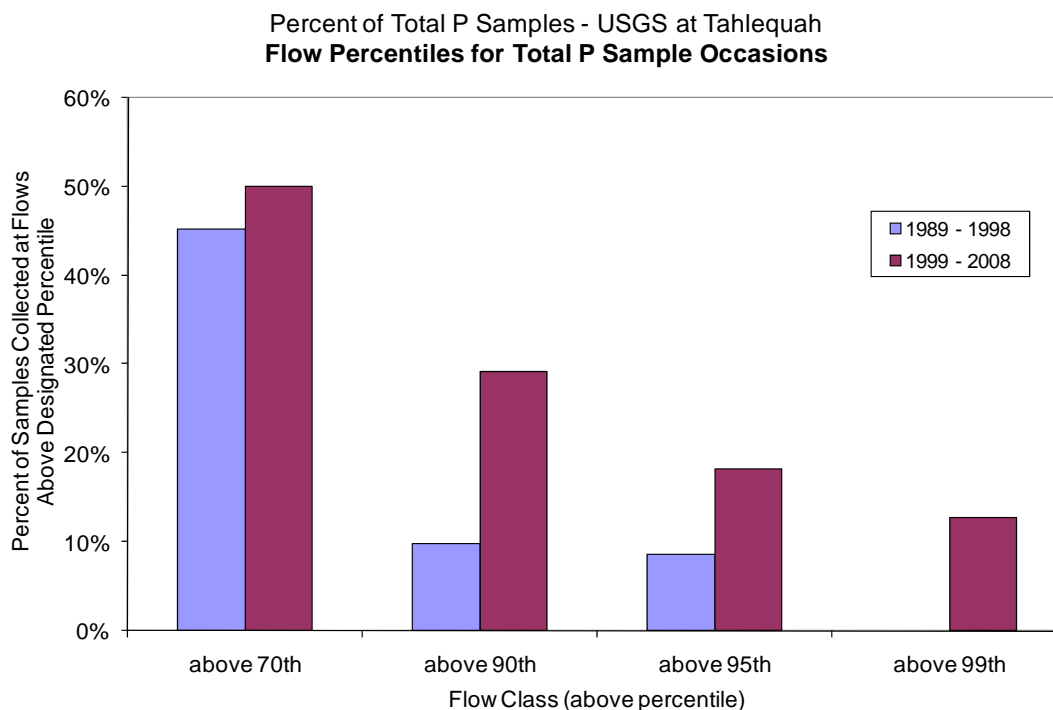
C)



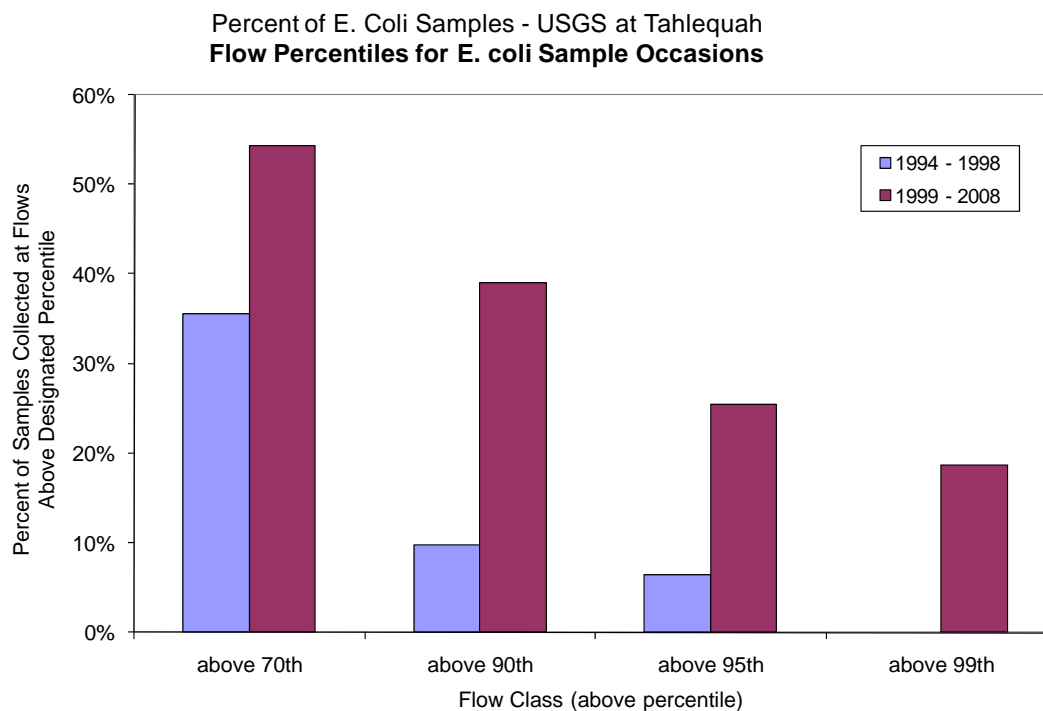
**Figure 10-3. Continued.**



A)

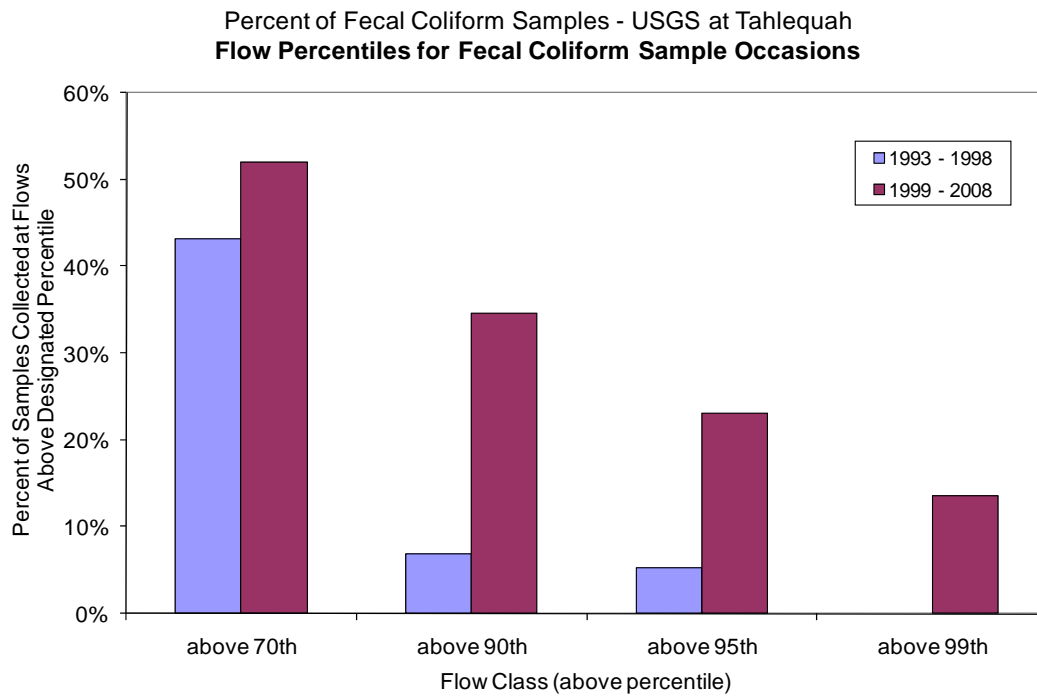


B)

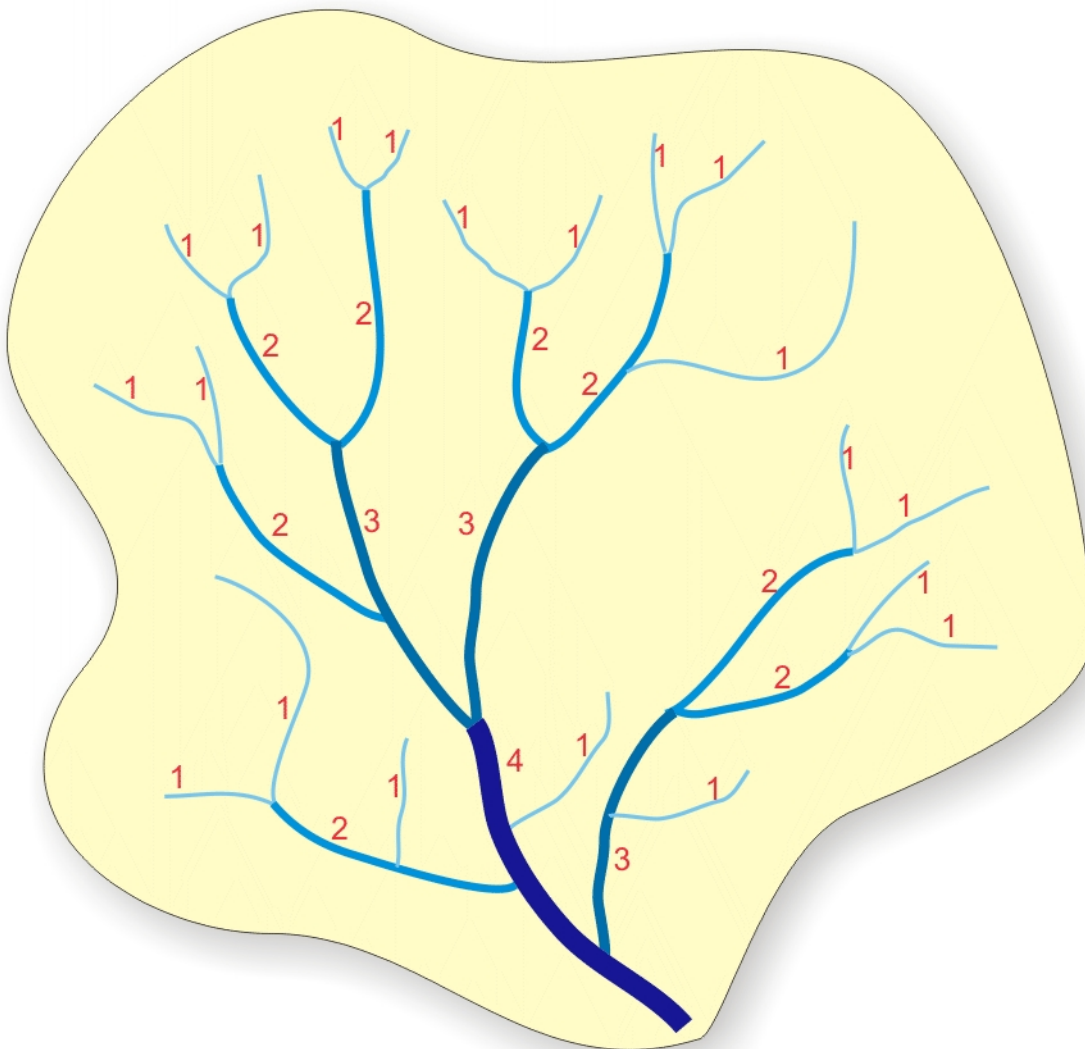


**Figure 10-4.** Percent of USGS samples at Tahlequah, analyzed for A) total P, B) *E. coli*, and C) fecal coliform bacteria that were collected under various flow regimes. The percent of samples below the 70<sup>th</sup> percentile of long-term (1980 - 2008) average daily flow is given along with the percents above the 70<sup>th</sup>, 90<sup>th</sup>, 95<sup>th</sup>, and 99<sup>th</sup> flow percentiles. Data are divided into two time periods (pre-1999 and post 1999). Numbers of available samples are as follows: pre-1999 *E. coli*, 31; post-1999 *E. coli*, 59; pre-1999 total P, 82; post-1999 total P, 110.

C)

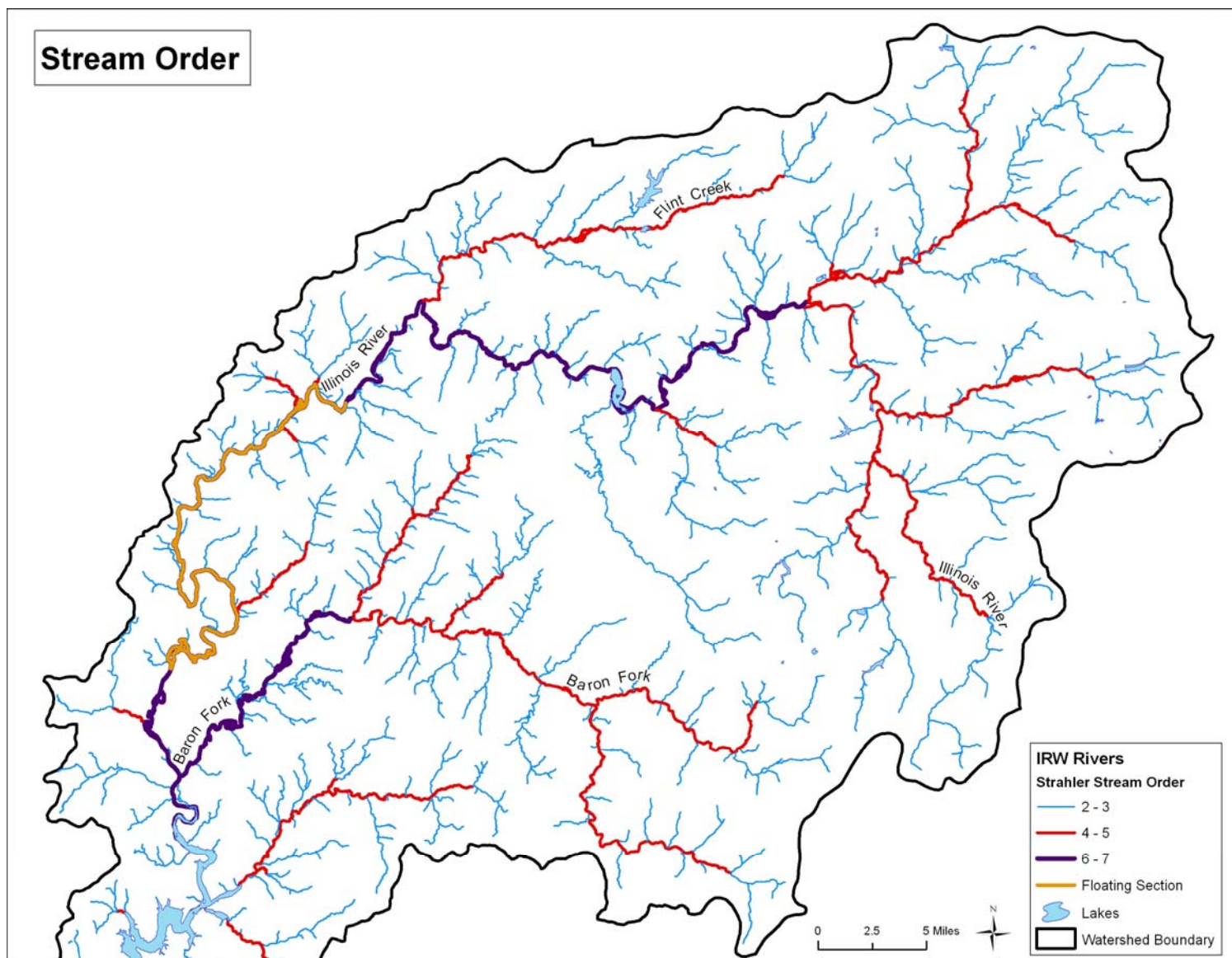


**Figure 10-4. Continued.**

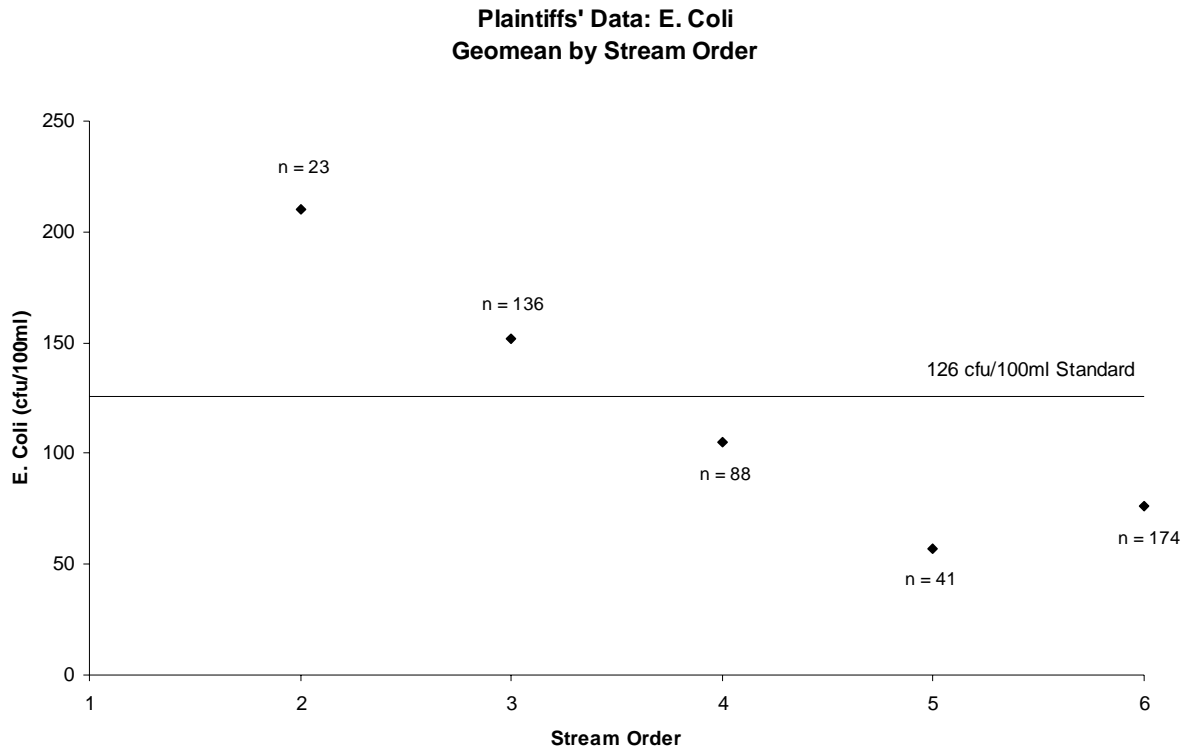


**Figure 10-5. Illustration of Strahler stream order for a watershed. The joining (confluence) of two 1<sup>st</sup> order streams forms a 2<sup>nd</sup> order stream; the confluence of two 2<sup>nd</sup> order streams forms a 3<sup>rd</sup> order stream. This process continues as you move further downstream. Note that the confluence of a first and a second order stream does not result in changing the stream order; it is still second order until that second order stream converges with another second order stream.**





**Figure 10-6.** Breakdown of streams in the IRW according to stream order. The very small first order tributary streams are not shown; few of these smallest streams were sampled by Plaintiffs' consultants. As small tributaries combine to form larger streams, the stream order increases from first order to higher numbers. Much of the Illinois River, including the main floating section, and also the lower portions of the main stem of Baron Fork, is 6th order based on the hydrological coverage applied here. Source: USGS National Hydrography Dataset



**Figure 10-7. Geomean of Plaintiffs' measured concentrations of *E. coli* for streams of different sizes in the Illinois River watershed, ranging from relatively small tributaries (coded as second order) to larger rivers (coded as 6<sup>th</sup> order).**

A)



B)



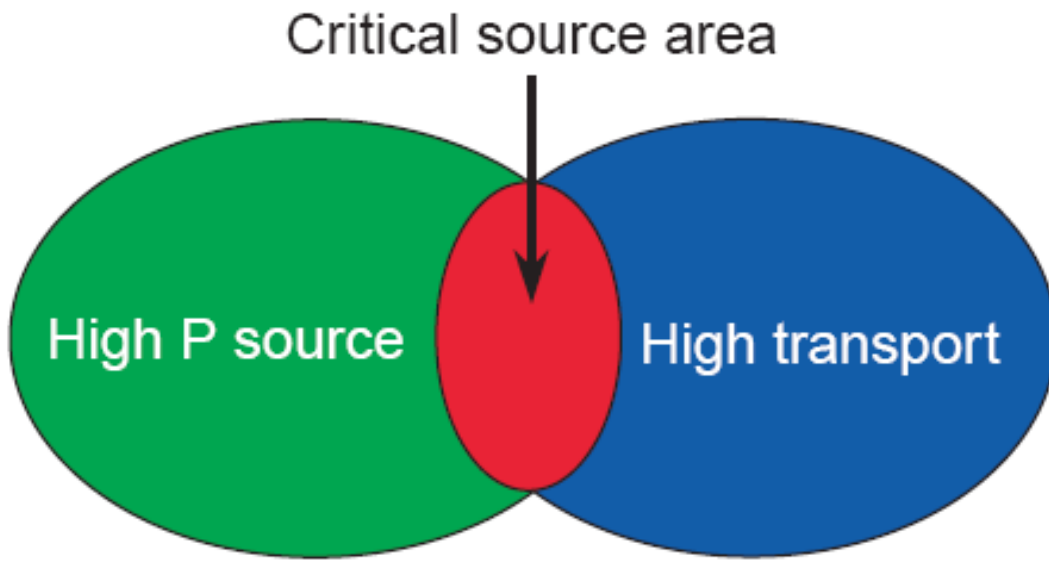
**Figure 11-1. Selected photos presented at the Preliminary Injunction hearing. A) cattle in pasture; B) areas that flood; C) areas without vegetative cover.**



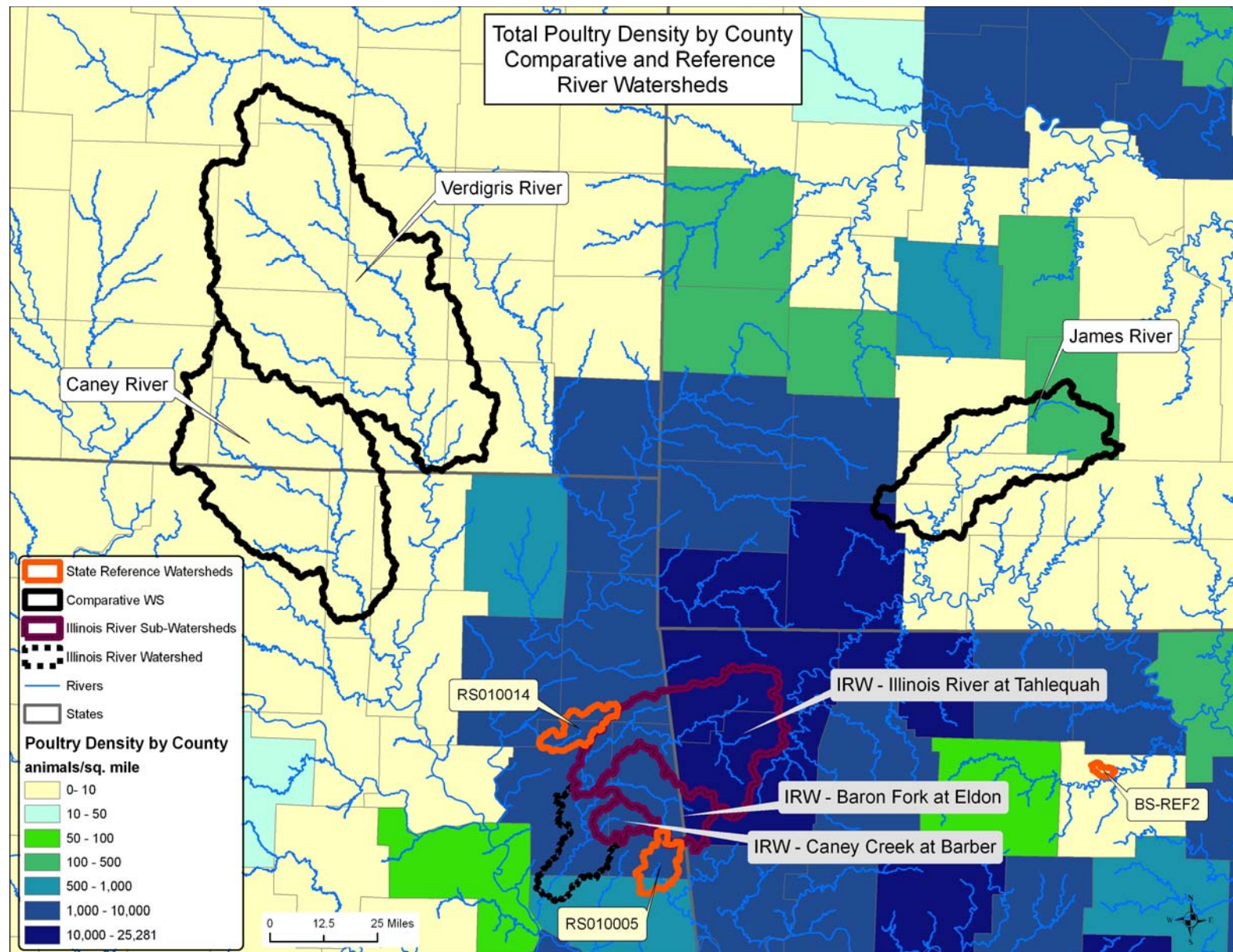
C)



**Figure 11-1. Continued.**

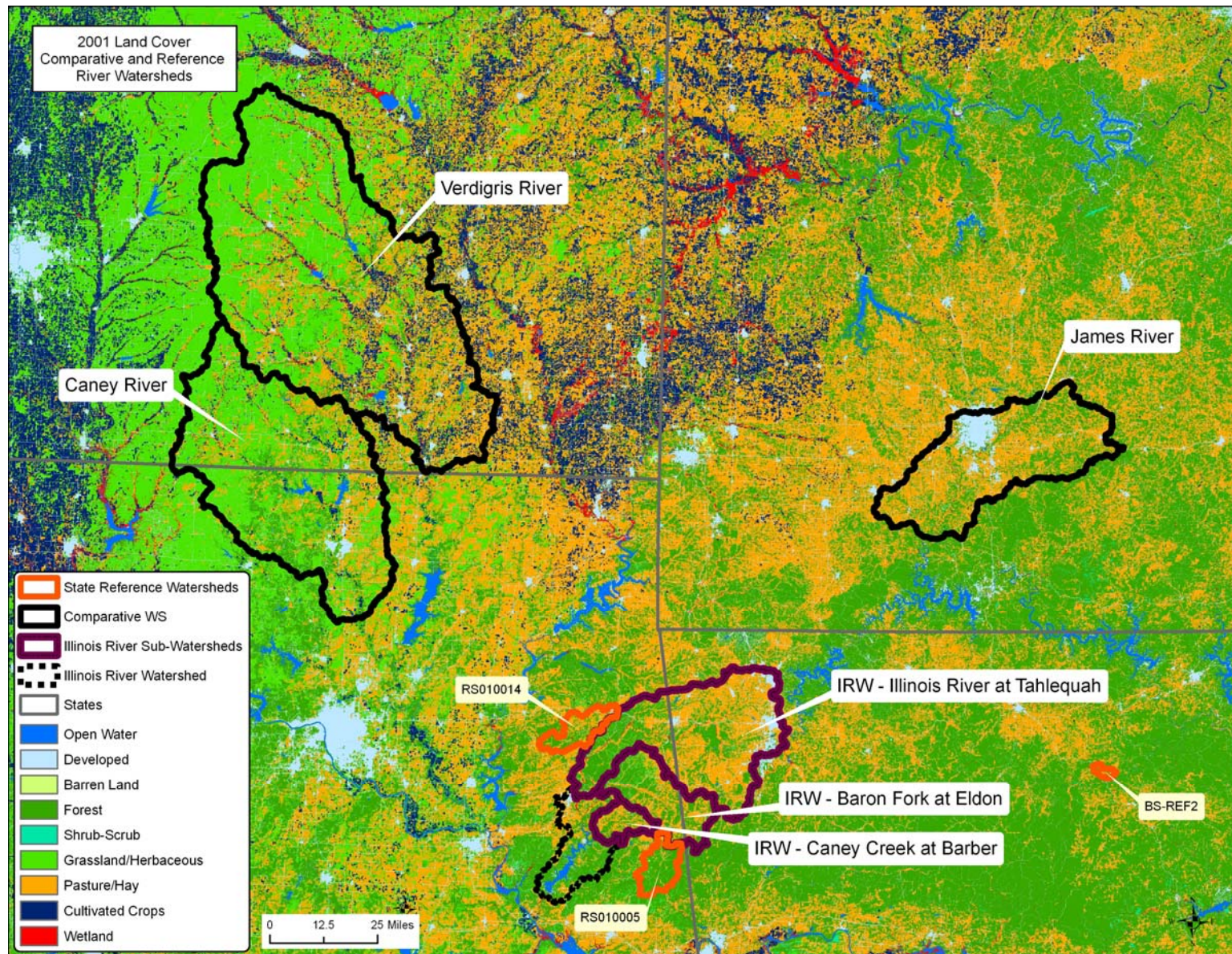


**Figure 11-2.** Schematic representation of critical source areas, the intersection of the locations where both a P source occurs and there is opportunity for transport of some of that P to a stream. (Taken from Sharpley et al. 2003a)



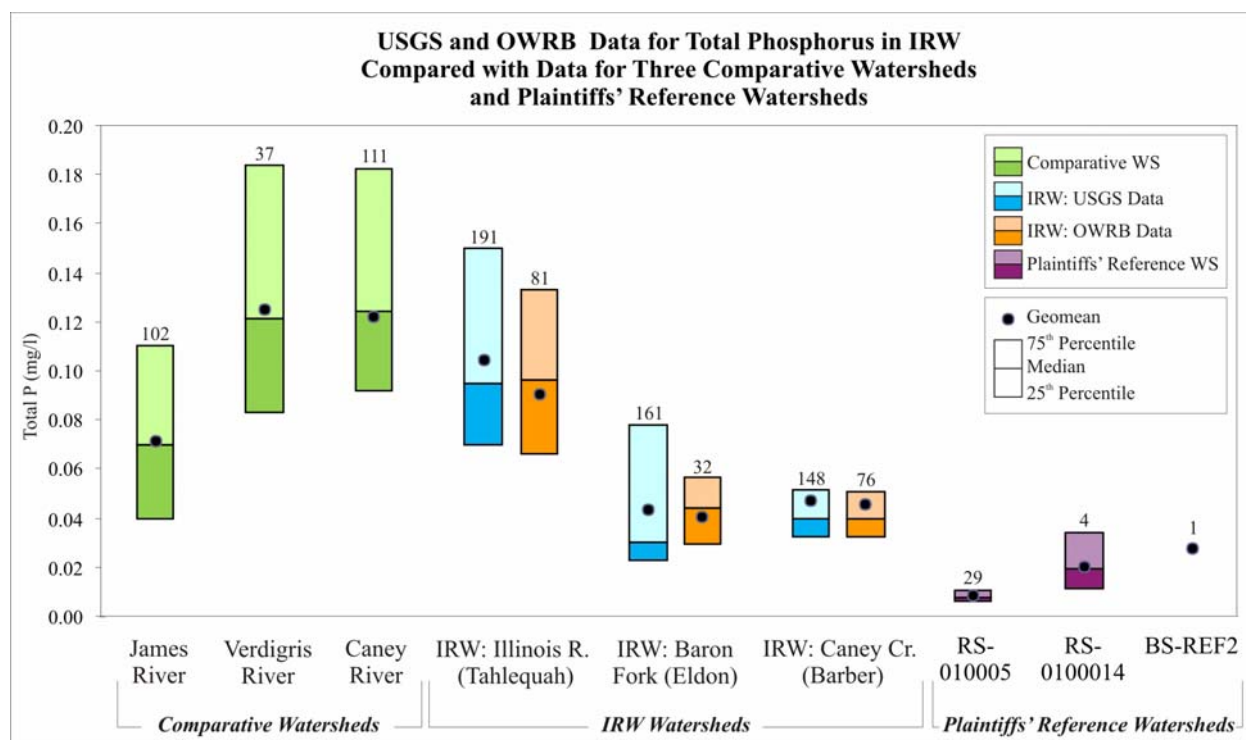
**Figure 14-1.** Estimated poultry density (animals per square mile), by county, in the IRW, in Plaintiffs' reference river watersheds, and in our comparative river watersheds (Caney River, Verdigris River, James River). (Source: 2002 USDA Agricultural Census)





**Figure 14-2. Land use in Plaintiffs' reference river watersheds, in the IRW, and in our comparative river watersheds. (Source: 2001 National Land Cover Dataset)**

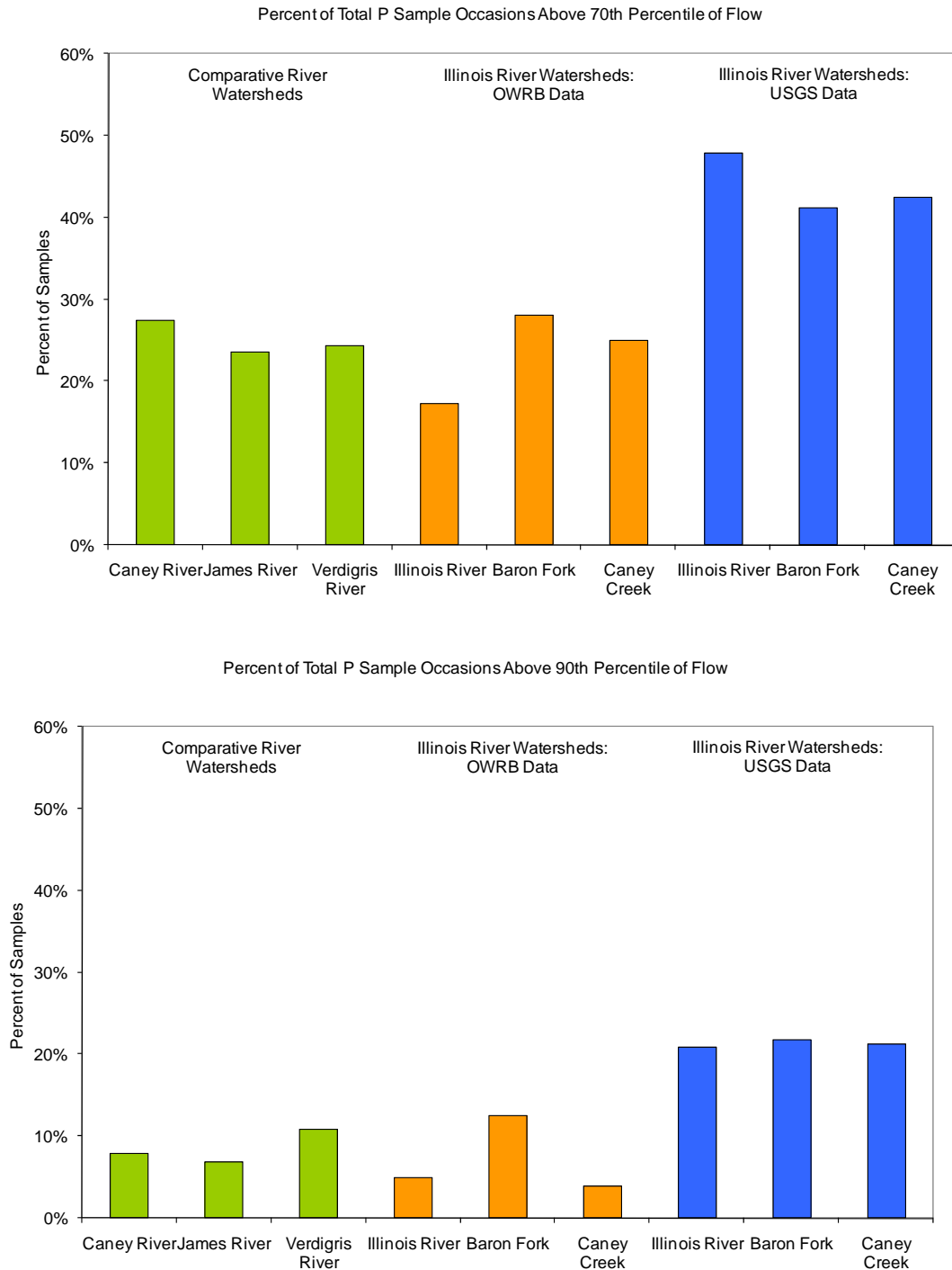




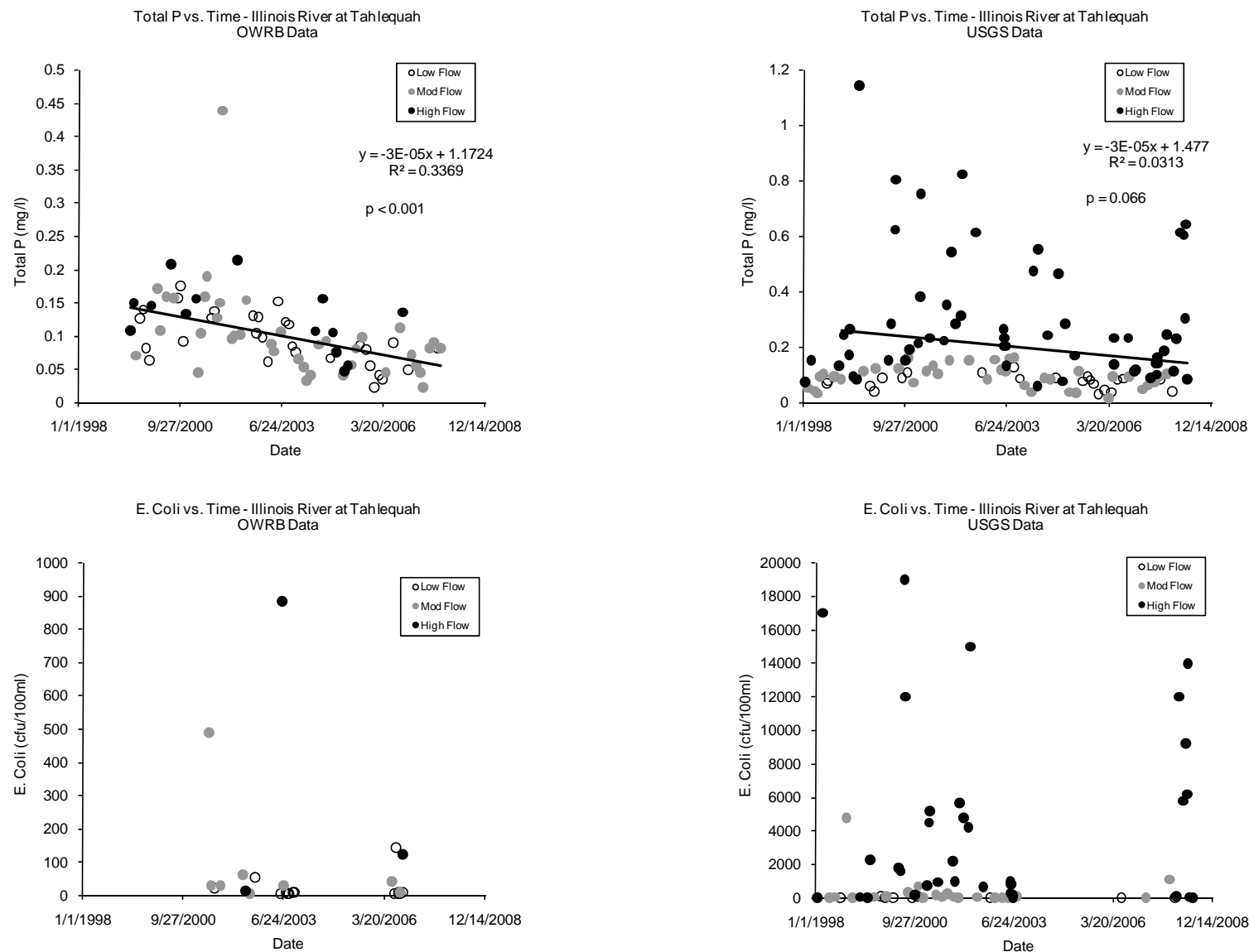
**Figure 14-3.** Graph showing total phosphorus summary statistics (median, quartiles, and geomean) for major IRW tributaries, comparative rivers, and Plaintiffs' reference watersheds. IRW data are displayed separately by data source (OWRB and USGS). USGS sampling was focused after 1999 on high flow periods and therefore generally shows higher concentrations, as compared with OWRB. The number of available samples is given over each bar.

**Years of data:** James River – 1999 to 2008, Verdigris River – 2002 – 2008, Caney River – 1986 to 2007, Illinois River at Tahlequah (USGS) – 1989 to 2008, Illinois River at Tahlequah (OWRB) 1999 – 2007, Baron Fork at Eldon (USGS) – 1980 to 2008, Baron Fork at Eldon (OWRB) – 1998 to 2001, Caney Creek at Barber (USGS) – 1997 to 2008, Caney Creek at Barber (OWRB) – 1999 to 2007, RS-010005 – 2005 to 2007, RS-0100014 – 2005 to 2006, BS-REF2 – 2005. Note: All of the total phosphorus samples collected within the Plaintiffs' reference watersheds were used for calculating statistics.

**Comparative Watersheds data sources:** James River – U.S. Geological Survey (USGS) Station ID 07052500, Verdigris River – Kansas Department of Health and Environment (KDHE) Station ID = 99989721, Caney River – Oklahoma Water Resources Board (OWRB) Station ID = 121400010010-001AT and U.S. Geological Survey (USGS) Station ID = 07175500

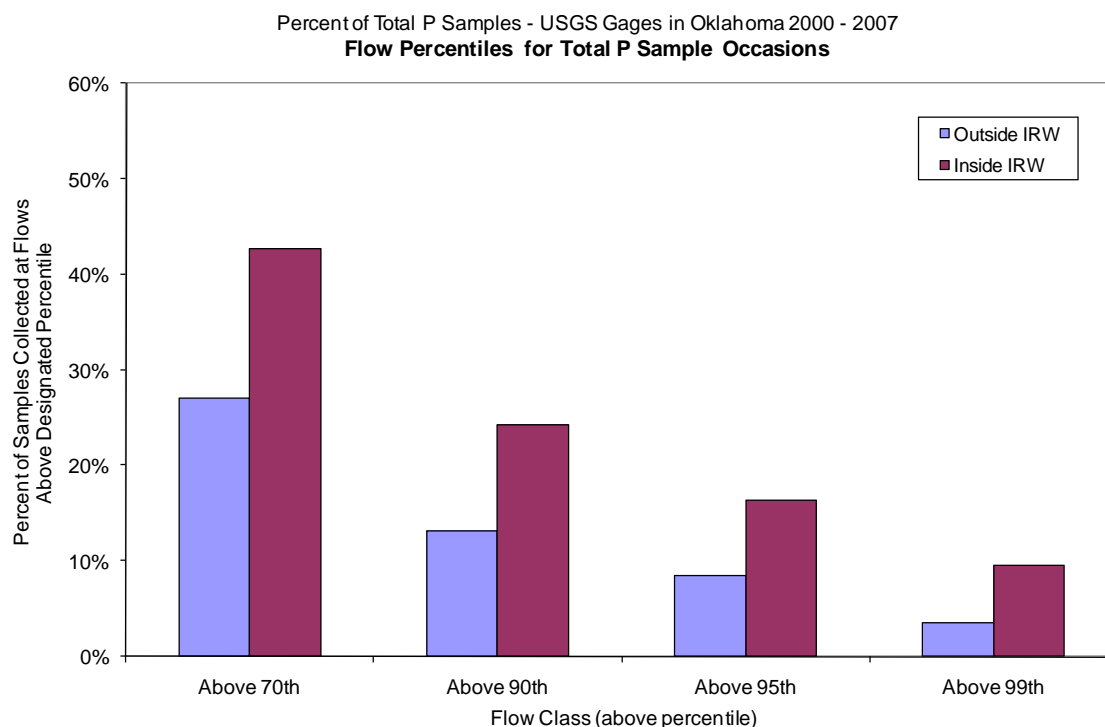


**Figure 14-4.** Percent of water samples collected and analyzed for total P that were collected under flow conditions that exceeded the 70<sup>th</sup> percentile flow (top panel) and 90<sup>th</sup> percentile flow (bottom panel) at each site. Comparative data are provided for the three comparative river watersheds and for the three major tributaries to Lake Tenkiller. The latter are split into two groups, using OWRB data and USGS data. USGS data at the IRW sites were consistently collected under higher flow conditions than either OWRB data in the IRW or data available at the comparative river watersheds. See Figure 14-3 for comparative watershed data sources.

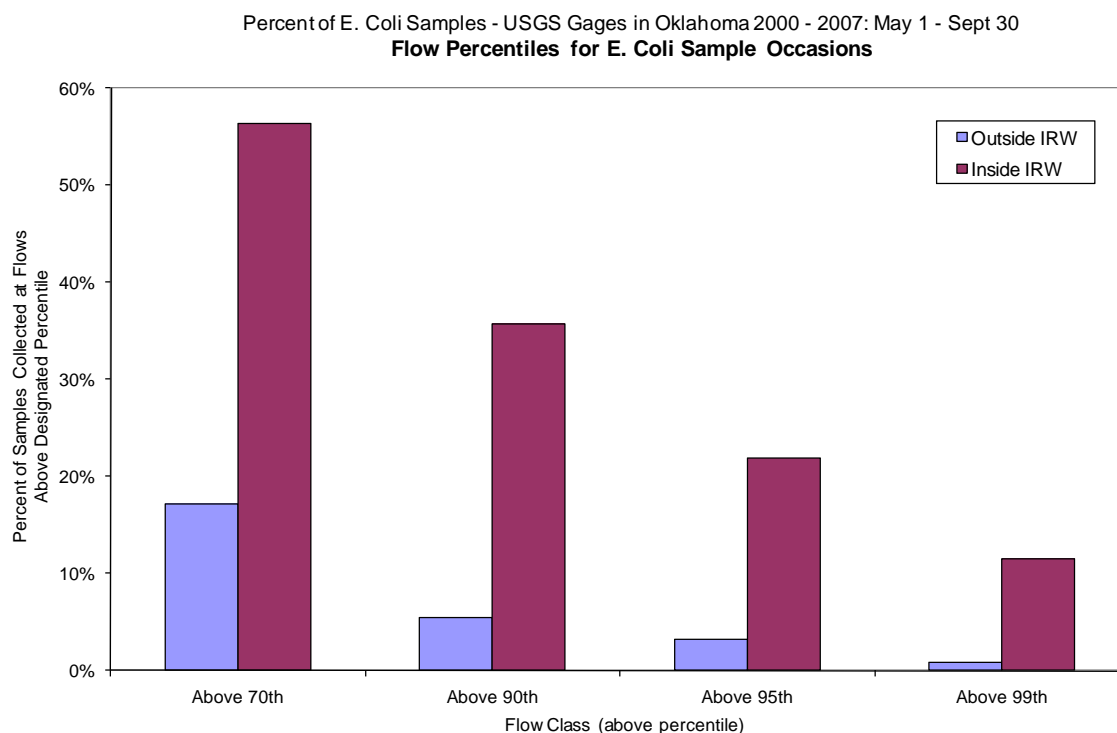


**Figure 15-1. Change in concentration over time in total phosphorus (top) and *E. coli* (bottom) in the Illinois River at Tahlequah, based on OWRB data (left panels) and USGS (right panels). One outlier was removed from the regression for TP in the OWRB database. The regression reported for TP in the USGS database started in 1999, with the change in sampling protocols.**

A)

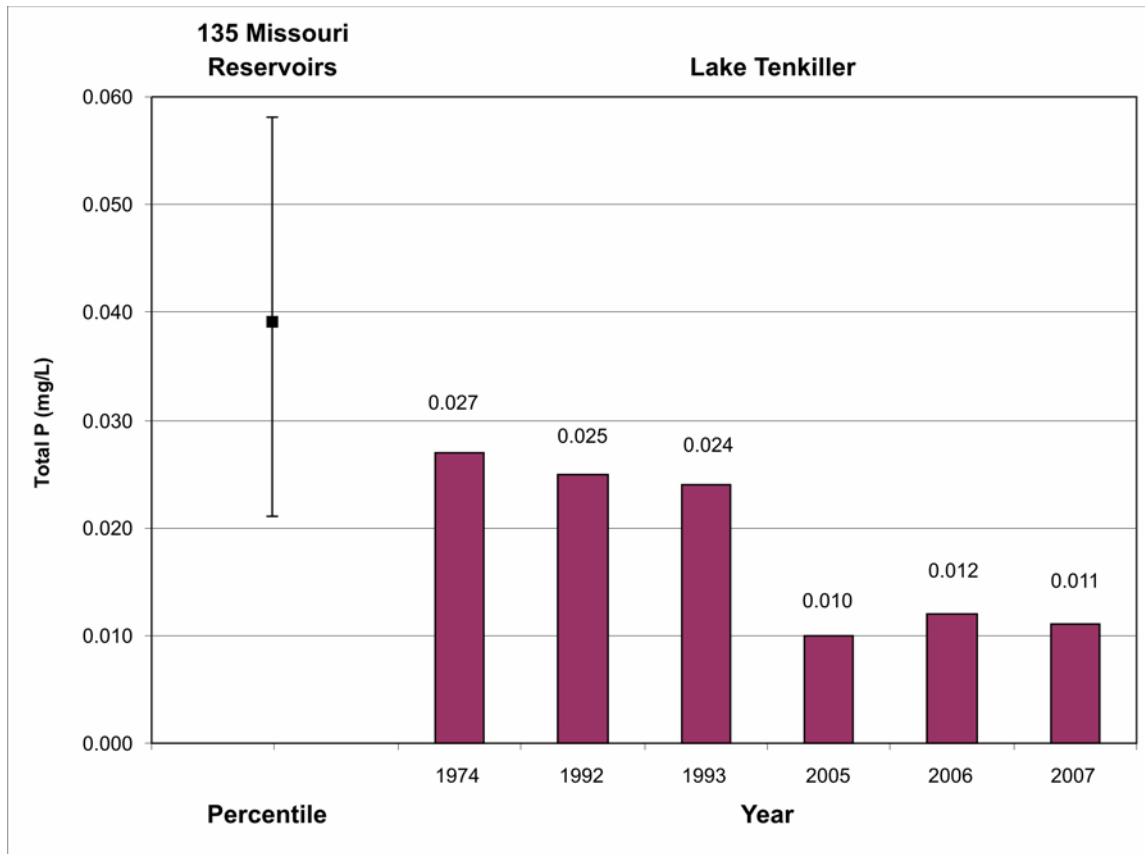


B)

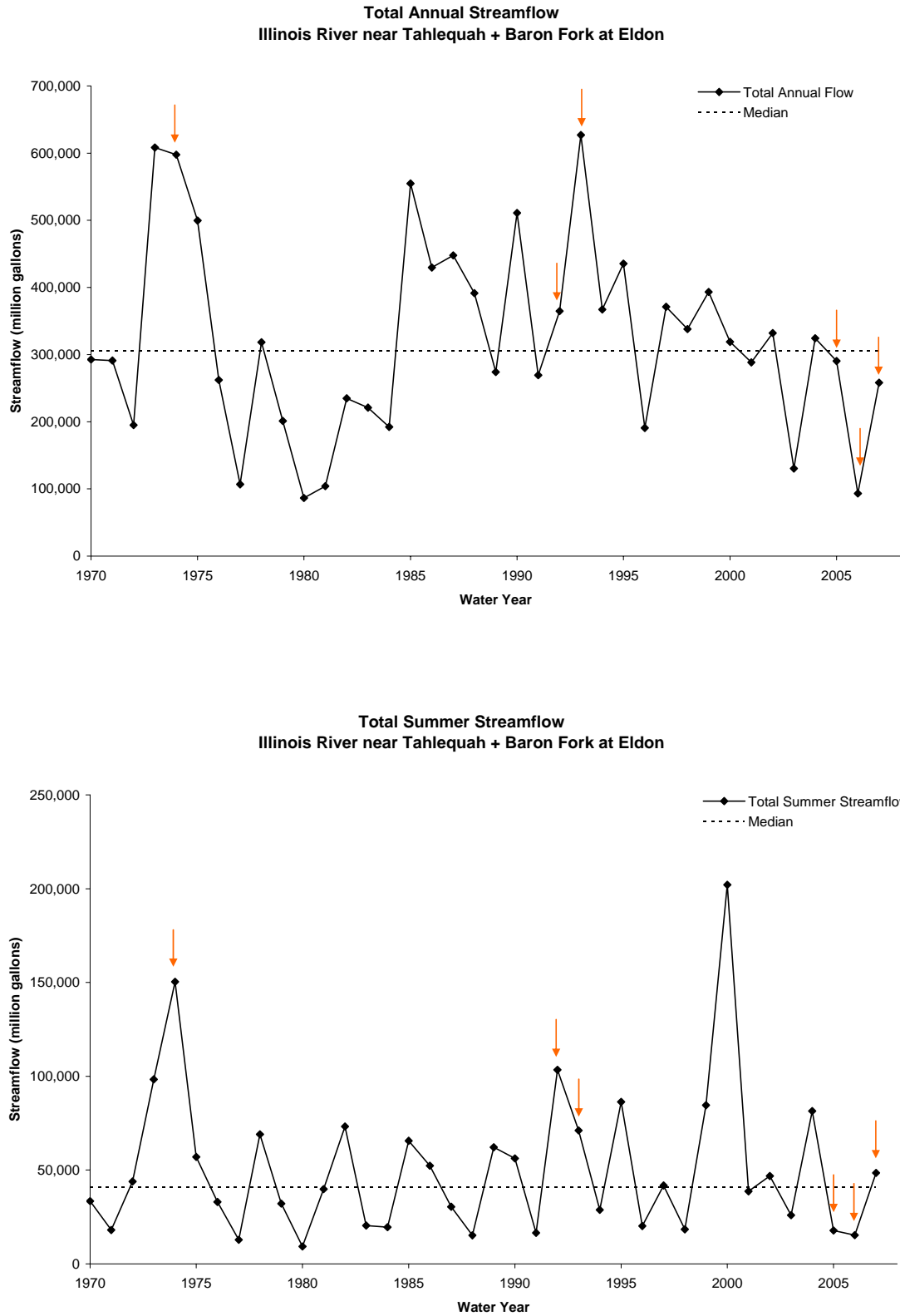


**Figure 15-2. Distribution of USGS data across flow classes for all monitoring stations in Oklahoma having continuous stream flow and total P concentration (Panel A) or *E. coli* (Panel B) measurements, inside (red) and outside (blue) the IRW. Included are all USGS monitoring sites having at least 5 total P or *E. coli* measurements. Flow class percentiles were calculated individually for each site. These data show that, inside the IRW, samples collected by USGS that were analyzed for total P and especially for *E. coli* (summer period) were disproportionately skewed to high-flow conditions.**

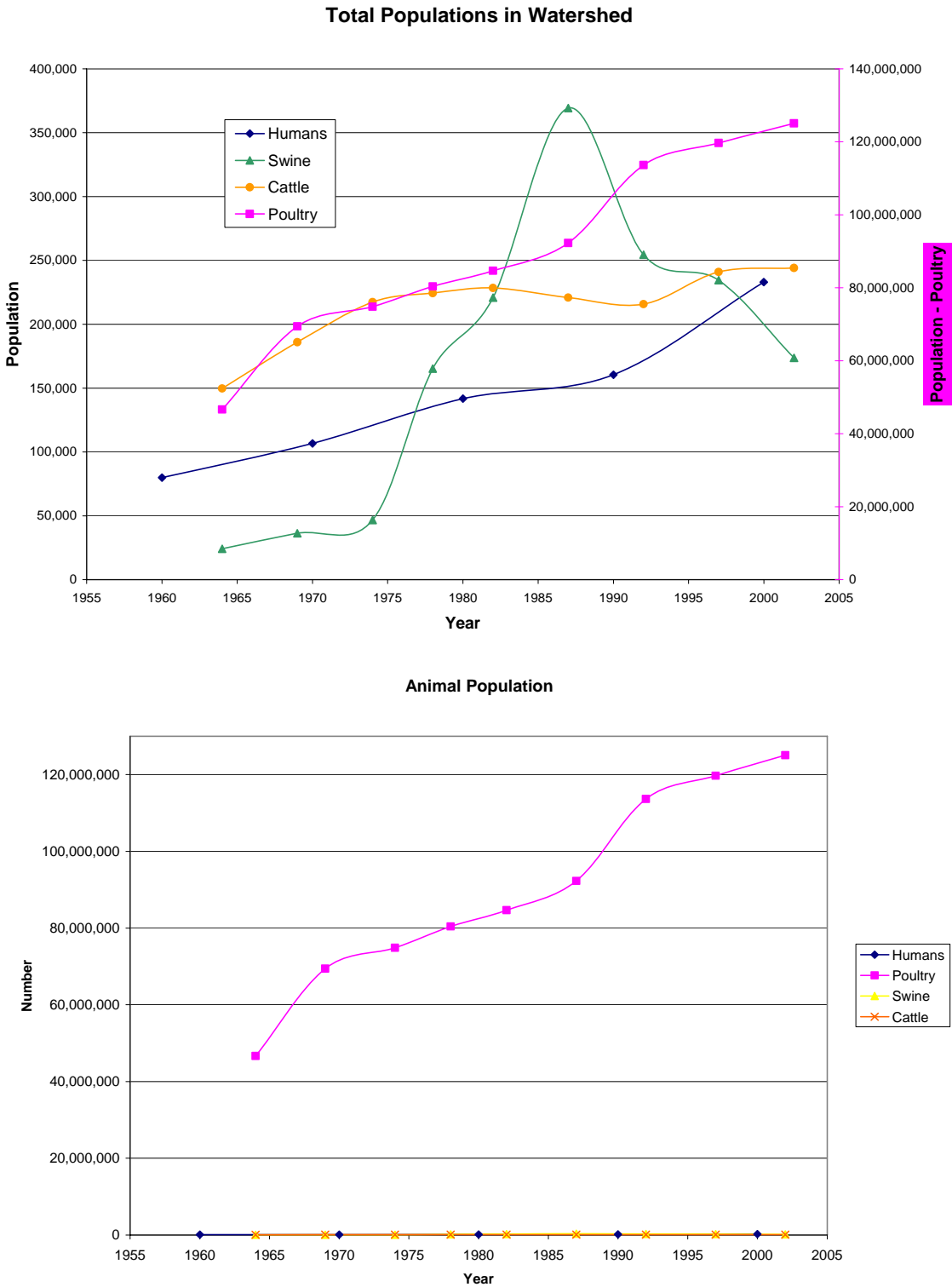




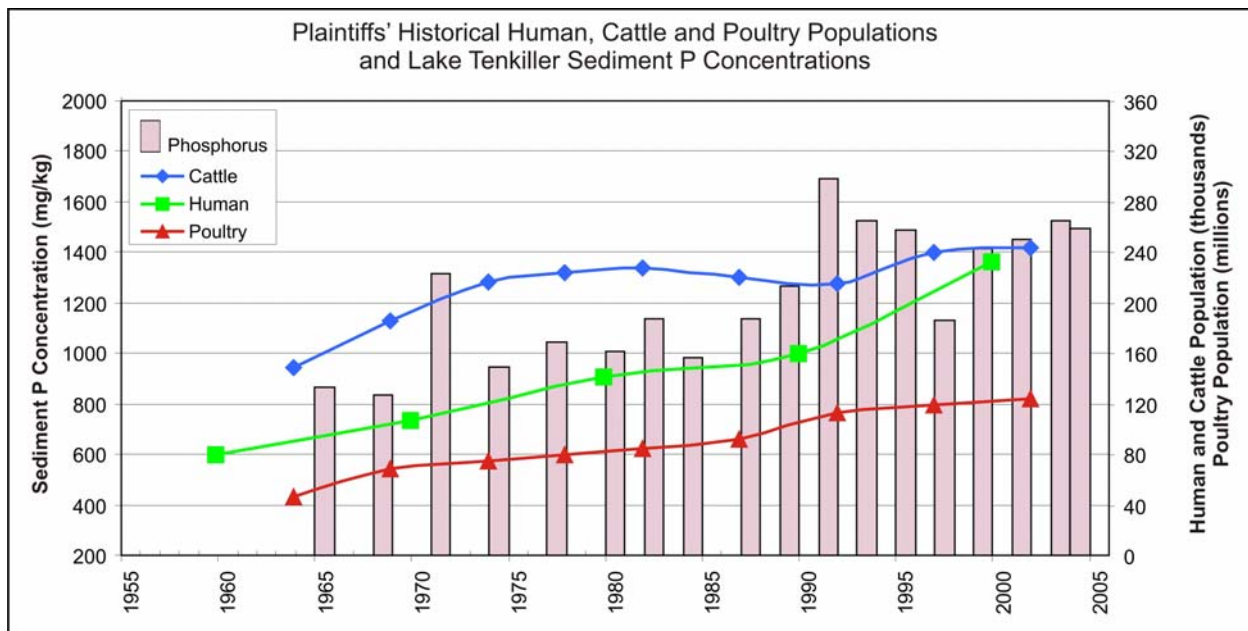
**Figure 15-3. Total P concentrations reported by Cooke and Welch (2008, their Figure 7) at site LK-01 (the lacustrine site nearest the Lake Tenkiller dam) in 1974, 1992, 1993, and 2005 through 2007. Also shown for comparison are the median and quartile values for total P measured in 135 reservoirs located throughout Missouri (based on data published by Jones et al. 2004). Phosphorus concentrations in recent years place Lake Tenkiller in the mesotrophic class and show a dramatic decrease (by more than 50%) in the total P concentration compared with earlier years.**



**Figure 15-4.** Annual (top panel) and summer (bottom panel) river flow into Lake Tenkiller from the Illinois River and Baron Fork as measured by USGS at Tahlequah and Eldon. Arrows indicate the years for which Cooke and Welch (2008) gave total P concentrations at sampling sites in Lake Tenkiller.



**Figure 16-1.** Two versions of the graph of changes in IRW populations over time directly from Plaintiffs’ consultant Meagan Smith’s considered material: one with scales adjusted to reveal similarities in trends, and one adjusted to conceal similarities in trends. (Source: Smith00000589\_Calculations.xls in Meagan Smith’s considered materials)



**Figure 16-2. Plaintiffs' estimates of numbers of humans and cattle in the Illinois River watershed from about 1960 to 2005. Also shown are measured values of dry phosphorus in Lake Tenkiller sediment at the LK-SED-1 location. Source: Meagan Smith considered materials Smith00000589\_Calculations.xls, QEA correction (new\_dates\_tenkiller\_cores.xls) of Fisher's sediment P considered material Core1234ages.xls from PI\_Fisher00027361.**



**Table 4-1. Estimated human population within the IRW in the year 2000 with centralized wastewater treatment and without centralized wastewater treatment. (Source: U.S. Census 2000 and Dr. Ron Jarman)**

<b>Municipality</b>	<b>Municipality Human Population with Centralized Wastewater Treatment</b>	<b>Percent of Municipality located within the IRW</b>	<b>IRW Human Population with Centralized Wastewater Treatment</b>
Fayetteville	58,047	58%	33,502
Gentry	2,165	100%	2,165
Lincoln	1,752	100%	1,752
Prairie Grove	2,540	100%	2,540
Rogers	38,829	79%	30,538
Siloam Springs	10,843	100%	10,843
Springdale	45,798	95%	43,330
Stilwell	3,276	88%	2,878
Tahlequah	14,458	80%	11,598
Watts	316	100%	316
Westville	1,596	100%	1,596
Bentonville	19,730	45%	8,903
Little Flock	2,585	0.5%	12
Gore	850	56%	478
Johnson	2,319	100%	2,319
Farmington	3,605	100%	3,605
Lowell	5,013	84%	4,189
<b>Total</b>	<b>213,722</b>		<b>160,564</b>
<b>Total human population within the IRW</b>			<b>237,162</b>
<b>Total human population without centralized wastewater treatment</b>			<b>76,598</b>

**Table 4-2. Estimated human population in the IRW in 1990, 2000, and 2007, based on population estimates within census block groups and the percentage of each census block group that occurs within the boundaries of the IRW.**

<b>Year (Data Source)</b>	<b>Number of People in the IRW</b>
2007 (ESRI model of U.S. Census data)	297,260
2000 (U.S. Census)	237,162
1990 (U.S. Census)	168,263

**Table 5-1. Median values of soluble reactive P immediately above and below WWTPs within the IRW, based on data collected between July 2002 and June 2003. (Source: Ekka 2006).**

<b>Stream</b>	<b>Number of Samples Above/Below</b>	<b>Median SRP Concentration (mg/L)</b>	
		<b>Above WWTP</b>	<b>Below WWTP</b>
Mud Creek	21/20	0.01	0.09
Osage Creek	21/21	0.02	0.07
Sager Creek	20/21	0.08	0.96
Spring Creek	20/21	0.06	1.95

**Table 5-2. Sewage bypasses in the IRW that were documented by Dr. Ron Jarman.**

	Number of Bypasses	Number of Years in Record	Total Number of Bypass Hours	Estimated Volume of Bypasses (Gallons)		Estimated Bacteria per Bypass (cfu/bypass)	
				Mean	Median	Mean	Median
Lincoln	25	4	226.50	9,060	7,000	$3.43 \times 10^{14}$	$2.65 \times 10^{14}$
Rogers	6	2	38.75	750	750	$3.28 \times 10^{13}$	$2.84 \times 10^{13}$
Siloam Springs	113	3	NR	4,099	200	$1.55 \times 10^{14}$	$7.57 \times 10^{12}$
Springdale	140	4	162.80	5,912	1,000	$2.24 \times 10^{14}$	$3.79 \times 10^{13}$
Tahlequah	90	7	137.80	1,000	1,000	$3.79 \times 10^{13}$	$3.79 \times 10^{13}$
Westville	20	7	133.90	500	500	$1.32 \times 10^{13}$	$1.32 \times 10^{13}$
Total	394		699.75				



**Table 7-1. Potential NPS sources visible from Plaintiffs' edge-of-field sites visited by Apex Companies staff in July, 2008..**

Site	Roadside Ditch	Pasture/ Hay Field	Cattle/ Horses	Active & Inactive Poultry House	Road		Housing	Non- Poultry Barn	Probable State Sample Collection Location**		
					Dirt/ Gravel	Paved			Roadside Ditch	Low Point in Field	Drainage Feature Other
002	X	X			X		X	X	X		X
007	X	X	X	X	X		X	X	X		
010	X	X	X	X	X				X		
023	X	X	X	X	X		X	X	X		
026	X	X	X	X	X		X	X	X		
029	X	X		X	X		X		X		
030	X	X	X	X		X	X	X	X		X
044	X	X		X	X	X	X	X	X		X
048	X	X	X	X	X		X	X	X		
052	X	X	X	X	X	X	X		X		
053E	X	X	X			X	X	X	X		X
059	X	X	X			X			X		
060	X	X	X	X		X	X	X	X		
068	X	X		X	X	X	X	X	X		
071	X	X	X	X		X	X		X		
073B	X	X		X		X	X				
29	X	X			X		X		X		
30	X	X			X		X	X	X		
01	X	X				X	X	X			X
07-230	X	X		X		X	X		X		
07-232	X	X		X	X				X		
07/7 (station)	X	X	X		X		X		X		X

<b>Table 7-1. Continued.</b>											
Site	Roadside Ditch	Pasture/ Hay Field	Cattle/ Horses	Active & Inactive Poultry House	Road		Housing	Non- Poultry Barn	Probable State Sample Collection Location**		
					Dirt/ Gravel	Paved			Roadside Ditch	Low Point in Field	Drainage Feature Other
07-LO	X	X	X	X	X		X	X	X		X
08	X	X	X	X	X				X		X
09		X				X					X
11	X	X	X	X	X		X	X	X		
14	X	X	X	X	X	X	X	X	X		
15	X	X			X		X		X		
16	X	X			X		X	X	X	X	
17	X	X		X	X		X		X		
18	X	X	X		X		X	X	X	X	
19	X	X			X	X			X		
20	X	X			X		X		X		
21		X	X	X		X			X		X
22	X	X		X		X	X	X	X		
24	X	X			X				X		
25	X	X			X	X			X		X
26	X	X	X		X	X	X		X		
27	X	X			X		X			X	
28	X	X			X	X	X		X		
1	X	X	X	X		X	X		X		
17A	X	X		X	X		X		X		
-25	X	X				X			X	X	
36	X	X		X	X		X		X		

Table 7-1. Continued.											
Site	Roadside Ditch	Pasture/ Hay Field	Cattle/ Horses	Active & Inactive Poultry House	Road		Housing	Non- Poultry Barn	Probable State Sample Collection Location**		
					Dirt/ Gravel	Paved			Roadside Ditch	Low Point in Field	Drainage Feature Other
53G	X	X			X		X		X		
64*	X	X			X	X	X		X		X
065	X	X				X	X		X		
222	X	X	X			X		X	X		X
259	X	X		X	X		X		X		
321	X	X			X				X		X
Q1	X	X	X	X	X	X	X	X	X		
Q2	X	X	X	X	X		X		X		X
Q3	X	X	X		X		X	X	X		
Z001	X	X	X		X		X	X	X		
Z030	X	X	X	X		X	X	X	X		X
Forest D		X				X	X	X			X
Forest U					X						X
SSA01		X				X	X				X
02	X	X	X	X		X	X	X	X		
23	X	X			X		X		X		
Number	55	59	27	30	41	29	47	25	53	4	19
Percent	92	98	45	50	68	48	78	42	88	7	32
* 64 and 053B are at the same location ** Based on judgment of Apex staff											

**Table 11-1. Frequency of occurrence of high-intensity precipitation in the IRW.**

<b>Location</b>	<b>Period of Record</b>	<b>Number of Hourly Values of Precipitation</b>	<b>Hourly Values Greater than 5 cm (1.97 in)</b>		<b>Percentiles of Precipitation Intensity (in/hr)</b>	
			<b>Number</b>	<b>Percent</b>	<b>99<sup>th</sup></b>	<b>99.9<sup>th</sup></b>
Tenkiller Dam (ID 348769)	1949-1997	12,532	6	0.05%	0.9	1.7
Fayetteville (ID 32444)	1966-2008	8,873	6	0.07%	1.0	1.7

Source: NOAA, National Climatic Data Center (NCDC)

**Table 14-1. Land use statistics, poultry house density, human population density, and municipal WWTP abundance for the comparative river watersheds as well as the State reference river watersheds. (Source: 2001 National Land Cover Dataset, Dr. Billy Clay for cattle counts, Dr. Ron Jarman for municipal WWTPs)**

	Comparative River Watersheds			Illinois River Watersheds			State Reference Watersheds		
	Caney River	James River	Verdigris River	Illinois River - Tahlequah	Baron Fork - Eldon	Caney Creek - Barber	RS010005	RS010014	BS-REF2
WS Area (sq miles)	1,936	992	3,300	940	311	88	92	91	10
Land Cover									
Developed – Roads/Parks	4%	6%	4%	6%	4%	4%	3%	4%	3%
Developed – Urban	1%	8%	1%	5%	< 1%	1%	< 1%	< 1%	< 1%
Total Developed	5%	14%	5%	11%	5%	5%	3%	5%	4%
Pasture/Hay	22%	51%	29%	48%	38%	48%	10%	45%	48%
Plaintiff Poultry House Count (Active, Inactive, Abandoned)	-	-	-	2,459	578	30	-	-	-
Defendant Poultry House Count (Active)	13	89	17	1,505	231	16	8	114	0
Plaintiff Poultry House Density (houses/sq. mile) <sup>1</sup>	-	-	-	2.6	1.9	0.3	-	-	-
Defendant Poultry House Density (houses/sq. mile)	0.007	0.09	0.005	1.6	0.7	0.2	0.08	1	0
Population Count (2000 U.S. Census Blocks)	59,466	256,076	50,430	194,800	10,031	5,299	2,365	2,624	124
Population Density (persons/sq. mile)	31	258	15	207	32	60	26	29	12
Cattle Count (Dr. Clay counts)	119,111	163,422	209,202	130,108	39,043	3,228	10,481	11,072	446
Cattle Density (cattle/sq. mile)	62	165	63	138	126	37	114	121	45
Number of Municipal WWTP <sup>2</sup>	4	9	8	6	2	1	0	0	0

<sup>1</sup> Estimated total count for Comparative River watersheds and State Reference watersheds; estimated active count for IRW watersheds<sup>2</sup> Municipal WWTPs serving greater than 1,000 people



**Table 18-1. Probable sources of NPS pollution adjacent to State's spring sampling locations visited by Apex Companies staff in July 2008<sup>1</sup>**

SPR-001JBF	Spring is about 10 ft from road, and appears to receive runoff from road.
SPR-001RPH	Spring immediately adjacent to road.
SPR-002X	Spring adjacent to major highway, and appears to receive runoff from pasture and road.
SRP-04	Spring about 20 ft from road, and appears subject to runoff from cattle pasture and road. Cattle observed both up- and down-gradient from spring, and standing in stream.
SPR-004RPH	Cattle access to spring; cow manure near sample location
SPR-012RPH	Cattle in water up-gradient from spring; many cattle in pasture up-gradient from spring. Spring appears to receive runoff from house and cattle area.
SPR-16	Spring located in town. Store about 100 ft up-gradient from spring.
SPR-18	Spring located about 10 ft from road. House about 400 ft up-gradient from spring.
SPR-24	House and cows upslope and about 1,000 ft from spring.
SPR-25	Spring immediately adjacent to dirt road.
SPR-26 site	Spring immediately adjacent to road in new housing development. Spring appears to receive runoff from construction area, pets, horses, and road. Horses present within 200 ft up-gradient of spring.
SPR-28	Spring located in town (Bentonville, AR). Spring appears to have runoff from housing area, construction, storm water drains. Trash present in spring. Spring flows under 6-lane highway.
SPR-32	Cattle access to spring.
SPR-36	Spring adjacent to road, and appears to receive runoff from road. Large lumber mill about 300 yd up-gradient from spring.
SPR-48	Evidence of cattle at spring.
SPR-61	Spring adjacent to road, and appears to receive runoff from road. House located about 150 ft from spring.
SPR-62	Spring about 10 ft from road, and appears to receive runoff from road.
SPR-63	House about 50 ft up-gradient from spring. Owner says cattle and dogs frequent spring area.
SPR-65	Spring appears to receive runoff from adjacent road and horse farm located across road.
SPR-Anderson	Cattle access to spring.
SPR-Hester	Spring appears to receive runoff from road and livestock pasture.
SPR-Jones	Owner says horses have access to spring. Spring appears to receive runoff from dirt roads and livestock areas.
SPR-LAL 16-SP1	Cattle access to spring.
SPR-LAL 16-SP2	Cattle (about 70 head) access to sample stream.

<sup>1</sup> No evidence of probable NPS pollution was observed at the following spring sites: SPR- 005RPH051206, SPR-07, SPR-14 State Park, SPR-200RPH